OVER HILL WIND FARM
Further Environmental Information
Volume I: Written Text & Figures

Energiekontor UK Ltd

March 2018

CONTENTS: *Chapters & Plans*

Plans:

6.2	Phase 1 Habitat Survey Results
6.3	NVC Habitat Survey Results
6.4	Groundwater Dependent Terrestrial Ecosystems (GWDTE) Survey Results
6.5	Annex 1 Habitat Survey Results
6.6	Protected Species Survey Results
6.7	Bat Survey Locations 2014 and 2016
6.8	Bat Surveys Spatial Activity 2014
6.9	Bat Surveys Temporal Activity 2014
6.10	Bat Surveys Temporal Activity 2016
6.11	Outline Habitat Management and Research Plan
6.12	Ornithological Designated Sites within 20 km
6.13	Site Boundary and Study Areas
6.14	Vantage Points and Viewsheds
6.15	Target Species Flight Activity: 2013/2014 Non-breeding Season
6.16	Target Species Flight Activity: 2014 Breeding Season
6.17	Target Species Flight Activity: 2014/2015 Non-breeding Season
6.18	Target Species Flight Activity: 2015 Breeding Season
6.19	Target Species Flight Activity: 2016 Breeding Season
6.20	Black Grouse Lek Locations and Activity: 2013 to 2016 [Confidential]
6.21	Raptor Activity: 2015 Breeding Season
6.22	Wader Activity: 2014 Breeding Season
6.23	Wader Activity: 2015 Breeding Season
6.24	Winter Bird Activity: 2013/2014 Non-breeding Season
6.25	Winter Bird Activity: 2014/2015 Non-breeding Season
6.26	Cumulative Assessment: Wind Farm Projects within 20km
8.1	Archaeology Constraints Plan
9.1	Mining Constraints Plan

***NB** All Landscape & Visual Figures and Visualisations are contained in FEI Volume 2.*

EnergieKontor

Over Hill

FURTHER ENVIRONMENTAL INFORMATION
CHAPTER 1: INTRODUCTION

March 2018

1 Introduction

1.1 This Further Environmental Statement (FEI) is submitted in support of a planning application made in May 2017 (17/0395/PP) by Energiekontor UK Limited to East Ayrshire Council (EAC) for eleven wind turbines and associated infrastructure (the "Proposed Development") on land at Over Hill, 6.6km north of Dalmellington. The planning application was accompanied by an Environmental Statement (ES) as required under the Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations. The ES was followed in June 2017 by an FEI with cumulative wireframes and photomontages requested by EAC.

1.2 It has been agreed with EAC that further information or clarification should be provided by the Applicant on issues raised by a number of consultees. This FEI provides that response. It is not intended as an exhaustive response to each point made by all parties; rather it provides further information which, together with the ES submitted in support of the planning application, is sufficient for a determination of the application to be made.

1.3 This FEI should be read in conjunction with the ES and identifies those parts of the ES that have been updated, supplemented or amended. All other parts of the ES not discussed in this FEI remain current and relevant. All methodology and terminology used in this FEI reflect that used in the ES.

1.4 FEI is submitted under the Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations and should be advertised and made available for consultation.

Structure of the FEI

1.5 This FEI is made up of the following volumes:

- Volume 1: A4 Main FEI- assessments and associated figures.
- Volume 2: A3 Landscape & visual figures and visualisations.
- Volume 3: A4 Appendix – technical reports and other information.

This FEI Volume 1 contains as follows:

- Chapter 1 provides context, summary of the structure of the FEI and contact details for further information.
- Chapter 2 provides an outline of the design development of the amended wind farm layout.
- Chapter 3 provides a description of the revised project to be assessed.
- Chapter 4 provides further information on various geology, hydrology and geohydrology matters in relation to comments that have been raised by consultees and an assessment of the revised wind farm layout;

- Chapter 5 provides further information on forestry matters and an assessment of the revised forestry proposals;
- Chapter 6 provides further information on ecological and ornithological matters in relation to comments that have been raised by consultees and an assessment of the revised wind farm layout and
- Chapter 7 provides further information on noise matters in relation to comments that have been raised by consultees and an assessment of the revised wind farm layout.
- Chapter 8 provides further information on archaeological matters and an assessment of the revised wind farm layout.
- Chapter 9 provides further information on coal mining matters in relation to comments that have been raised by consultees and an assessment of the revised wind farm layout.
- Chapter 10 provides further information on landscape and visual matters in relation to comments that have been raised by consultees and an assessment of the revised wind farm layout.
- Chapter 11 provides further information on traffic and transportation matters and an assessment of the revised wind farm layout.

Contact for Further Information

1.6 A hard copy of this FEI will be available for viewing during normal office hours at EAC's offices at Council Headquarters, London Road, Kilmarnock, East Ayrshire, KA3 7BU as well as at Cumnock Library, Rothesay House, 1 Greenholm Road, Cumnock KA18 1LH.

1.7 For additional copies, a charge of £15 will be made for a full electronic copy of this FEI on CD. Costs for paper copies are as follows:

- Volumes 1 (Main FEI) and 3 (Appendices): £70
- Volume 2 (Landscape & Visual Figures): £350

Requests for copies should be made to:

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Over Hill

ENVIRONMENTAL STATEMENT
CHAPTER 2: WIND FARM DESIGN DEVELOPMENT

March 2018

2 Wind Farm Design Development

Introduction

2.1 This Chapter outlines the issues and constraints behind the turbine and infrastructure amendments that took place through dialogue with SNH, RSPB and East Ayrshire Council. As part of the wind farm planning application consultation period following planning submission, in May 2017, SNH confirmed:

> *'We **object** to this proposal due to its impacts on the nationally important carbon-rich soils, deep peat and priority peatland habitat which are present on the site. In our view the significant effects of the proposal on this area have not been substantially overcome through siting, design or other mitigation, as required by Scottish Planning Policy. We set out our reasons in paragraphs 3.2 – 3.13 below.*
> *We will however reconsider our position if the proposal is amended to safeguard more of the nationally important resource. We believe that this may be achieved through review and alteration of the infrastructure and construction requirements in areas of peat and peatland habitats, balanced with revised habitat management proposals which increase the area of peatland habitat to be restored. Our advice on these matters is provided in paragraph 3.14 below and in Annex 1.*
>
> *We would welcome further discussion with the applicant and planning authority regarding this proposal. The applicant has indicated that they are prepared to engage in such discussions. If the planning authority however intends to grant planning permission against this advice, there is no need to notify Scottish Ministers'.*

Turbine and Infrastructure Design Iterations with SNH and RSPB

2.2 To address the above a meeting was held at the SNH Office, Hamilton on 25th October 2017 with SNH, RSPB and East Ayrshire Council. At the meeting concerns were voiced about the most sensitive blanket bog being located at Martyr's Moss and particularly in the area of Turbine 4 and its associated track. Consequently avoidance of this and the central deeper peat area was the preference of SNH and RSPB. The removal of trees from the bog was also acknowledged as an important measure in bog restoration.

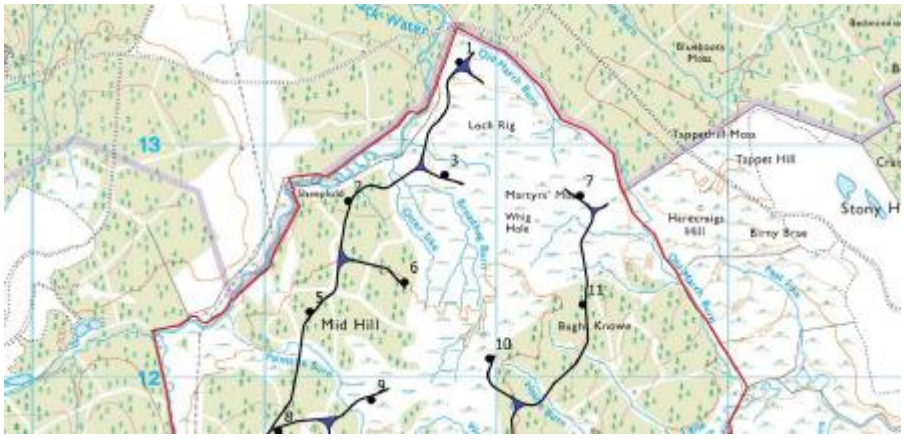
At that meeting it was agreed that the FEI should include the following:

- Energiekontor offered to submit a revised 10 turbine layout which had Turbine 4, and associated track either side removed, and an alternative access track to reach the now "stranded turbines".
- Provide increased clarity on the dressing of peat on tracks and the borrow pit as well as the proposed piled foundation process.
- Clearer piled foundation drawings.

- All enhancement measures should be included in a revised Habitat Management Plan (HMP) including bog restoration techniques and not just management.
- Grazing agreements need to be applied as conditions, for bog enhancement.
- Revised Peat Habitat Management Plan (PHMP).
- Revised Draft Peat Management Plan.
- Revised Peat Slide Risk Assessment.
- Peat Depth measurements on new locations/un-surveyed areas.
- Updated Coal Mining Risk Assessment.
- Assessment on borrow pit of Ground Water Terrestrial Ecosystems (GWTEs).

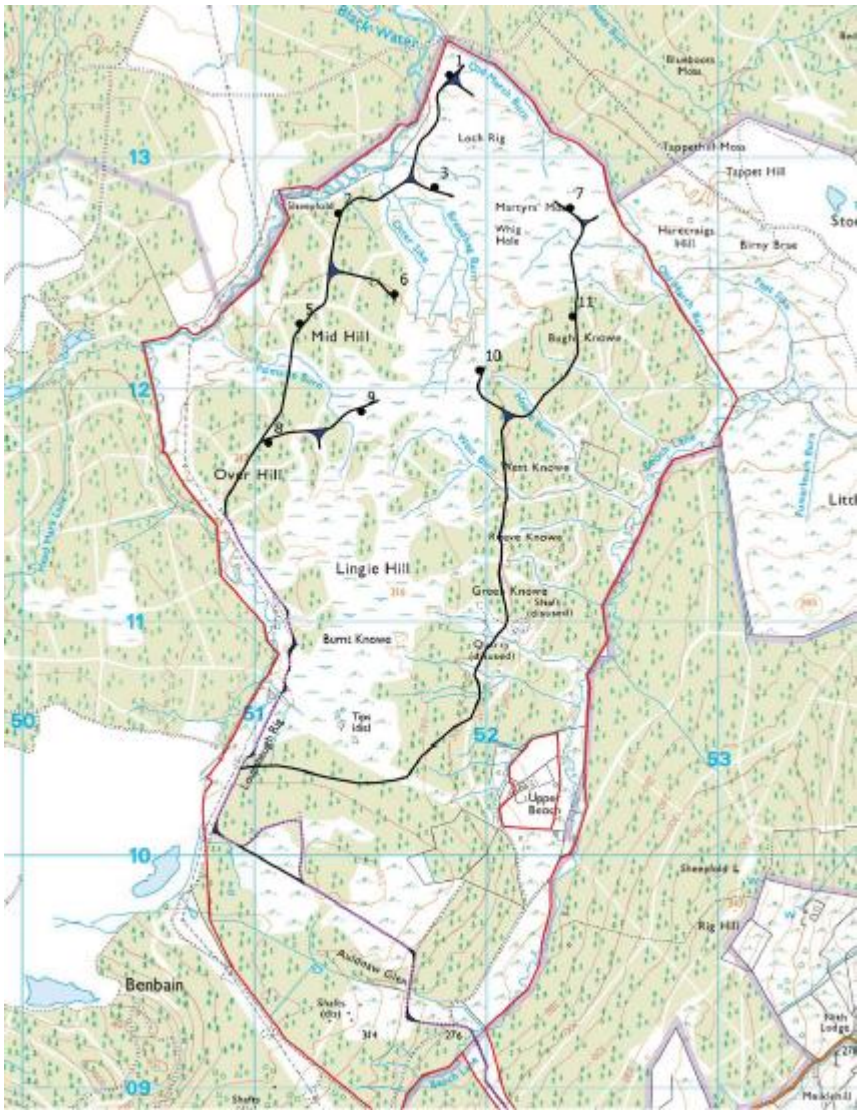
2.3 As agreed at the above meeting, Energiekontor provided, by email, on 1st December 2017 a revised wind farm layout with Turbine 4 and associated track removed as shown below in Plate 1.

Plate 1: Revised 10 Turbine Layout Presented at SNH Meeting, 31st October 2017



2.4 Due to the gap created between T1 and T7 by the removal of T4 a requirement for an alternative access track to connect T7, 11 and 10 was created. As such Energiekontor agreed on the routing of the below track (Plate 2) with SNH following consideration of the options with the project consultants assessing the options. A, potentially shorter, route crossing the central part of the peatland and connecting Turbine 10 to Turbine 9 was deemed to be too sensitive as it would cross the core area of the main peatland unit

Plate 2: Proposed On-site Access Track



2.5 On 19th December 2017 SNH confirmed by email to Energiekontor that while the proposed changes are welcome they did not go far enough to enable SNH to withdraw its objection.

2.6 SNH welcomed the removal of T4 however noted they would like to see T7 (in particular) and some or all of T6, T9, T10 and T11 pulled back further from the most sensitive peatland unit.

2.7 On 17th January 2018 EK passed a further revised 10 turbine layout to SNH which was the result of amending the locations of the above mentioned turbines (T6, T7, T10 and T11) where constraints allowed. The turbine and track movements that were possible, given the on-site constraints, are detailed Table 1 below and shown in Figure 2.1 of this FEI.

2.8 On 7th February SNH responded supportively by email to the above mentioned turbine movements. SNH also asked:

i) If there was scope for further forest clearance, from areas of peat. EK responded noting this would be discussed at the forthcoming meeting arranged for 21st February. At that meeting EK noted it would be assessed by our forestry consultants, DGA, with a view to increasing tree removal on the more sensitive part of the bog.

ii) Is it still the intention to use piled, rather than gravity, foundations for all turbines in deep peat? EK confirmed at the meeting of 21st February that this would be done where peat depth is measured to be in excess of 2 metres. However pre-construction geotechnical survey would be required in order to determine the final piled design.

iii) Given the presumption in Scottish Planning Policy (SPP), para. 170, that areas identified for wind farms should be suitable for use in perpetuity and what assurances can be given that subsequent generations of wind farm at this site would not encroach in the bog? EK responded that it is important that individual planning applications are judged on their own merits and not on some potential future scenario which may or may not occur. Any future planning application for repowering would require to be accompanied by a robust EIA which would be judged against the relevant guidance at the time. That said, it is more likely that any future repowering at the site would involve fewer but larger wind turbines. There is a limit at Over Hill in terms of electricity export that can be accommodated on the electricity network, and a general trend exists within the turbine manufacturing industry towards larger turbines with increased rated capacities (e.g. only a few years ago typical onshore turbine capacities were around 2MW – 2.5MW, whereas now they tend to be between 3MW – 5MW). This trend is likely to continue, so one would expect a repowered Over Hill would have the same overall installed site installed capacity, but from a fewer number of turbines, with turbine positions designed to take account of peat depth and other site constraints.

2.9 The above mentioned meeting on 21st February with SNH was arranged to essentially run through the revised visualisations. At that meeting EK confirmed that they would submit the above mentioned layout changes, as FEI to the Council and, prior to that submission would agree the scope of the landscape and visual assessment work with them.

Table 1: Final Amendments to the Original 11 Turbine Layout

Turbine	*Landscape & Visual Original ES Turbine Numbering*	*Easting*	*Northing*	*Movement Relative to Original 11 Turbine Layout*
T1	1	251840	613355	No movement.
T2	2	251361	612758	No turbine movement west possible due to transmission line buffer.
T3	3	251777	612871	No movement.
T4	4			Turbine removed with 860 m of track to north and south.
T5	*8*	251195	612283	Not possible to move turbine west from bog due to transmission line.
T6	*5*	251531	612430	Turbine moved as far from the bog edge as possible (75 m) given the minimum turbine wake separation spacing required to T2 and T5. 75m less track required.
T7	6	252790	612257	Turbine moved 680 m to plantation, well away from main peatland unit. 570 m of track to south deleted. A new track spur measuring 543 m was created to connect this new turbine location.
T8	*7*	251061	611770	No turbine movement west possible due to transmission line buffer.
T9	9	251461	611904	Not possible to move turbine west due to watercourse buffer and minimum spacing requirements to T5 and T8. Track shortened by 54m.
T10	10	251998	611990	Moved turbine 97 m south into shallower peat away from the main peatland unit. Track shortened by 125 m as turbine further west.
T11	11	252423	612283	Moved turbine 62 m south east from the main peatland unit to achieve a more sensitive development proposal.

Environmental and Technical Constraints Considered in Design

2.10 As part of the above mentioned site layout proposed redesign, the following environmental and technical constraints were considered and some can be seen in Figure 2.1, Environmental Constraints, Turbine and Infrastructure Layout, of this FEI document:

I. *Watercourses:* A 50m set back from either side of the on-site watercourses was used to address potential pollution or sedimentation events. Where possible any infrastructure was designed to avoid this buffer.

II. *Peat Depth*: The peat depth information for the site was used to inform upon the above mentioned moves i.e there was a preference to move to a lower peat depth. That said it was agreed that Martyr's Moss Peatland unit located in the central to northeast was deemed to be the most sensitive area and any turbine or infrastructure moves away from there would be positive from a peat perspective.

III. *Slope Angle:* Whilst there are very few steep slopes within the site boundary care was taken to ensure, where possible, the slope angle for tracks was minimised. Most turbine manufacturers have an upper limit of 12 degrees (refer to Peat Slide Hazard Risk Assessment (PHRA) Map 5, Slope Angle.

IV. *Forestry:* Where possible tracks were routed around forestry compartments to minimise felling. However due to the high level of constraints this was not often possible. Energiekontor acknowledge the part felling trees have in peatland restoration and the removal of trees from the better quality area of bog. The visual relationship of the turbines to the forestry and moorland areas has also been an important consideration. The forestry consultant worked in consultation with the ecologist and the landscape architect to agree the forest design.

V. *The Existing Pylon Line:* A 342 m buffer which National Grid and Scottish Power Transmission advise upon to the nearest turbine.

VI. *Turbine Wake Separations:* In order to maximise the efficiency of the turbines so the wakes of the upwind turbines do not interfere with the yield of the downwind turbines this factor requires consideration.

VII. *Archaeology/Cultural Heritage:* A review of known assets was carried out as part of the design process by the consultant archaeologist to ensure that the above design amendments were achievable. This review included a consultation with West of Scotland Archaeological Service (WoSAS) regarding the implications of routing the eastern access track through the remains of historic Ironstone mining.

VIII. *Ecology:* Protected species and bird surveys were checked to ensure none of the revised infrastructure would impact negatively on them.

Consultation Responses

2.11 Responses to queries and requests for further information or clarifications are dealt with in the relevant chapters of this FEI.

Over Hill

FURTHER ENVIRONMENTAL INFORMATION
CHAPTER 3: PROJECT DESCRIPTION

March 2018

3 Project Description

Introduction

3.1 This chapter provides an outline of the Proposed Development which can be seen in Figure 3.1: Turbine & Infrastructure Layout Plan, at the end of this chapter. This chapter presents the amendments to the wind farm infrastructure. Reference is made to the relevant figures in the original ES rather than duplicating them in this FEI document.

Description of the Proposed Development

3.2 The Proposed Development Area is located approximately 6.6 km to the north east of Dalmellington, and 7.9 km south of Ochiltree, across the summits of Over Hill, Lingie Hill, and Mid Hill of the Upper Nith. The Proposed Development Area is sited on undulating open moorland hills, lying between c.220 m and c.330 m Above Ordnance Datum (AOD).

3.3 The topography of the Proposed Development Area is consistent with the gently undulating foothills of the Southern Uplands, comprising smooth rounded hills that slope eastward into the valley of the Beoch Lane. Land cover consists of open moorland and areas of recently planted coniferous plantations. The Proposed Development Area is bounded by mature coniferous plantations (Forestry Commission land) on all sides apart from the north east, which is bounded by the House of Water opencast coal mine.

3.4 There are no statutory designated landscapes within 10 km of the Proposed Development Area. Within the locality the land use is predominantly forestry and open cast coal mines.

3.5 The Proposed Development, is illustrated in Figure 3.1 of this FEI and includes the following amendments to the original development presented in the ES:

i. **Wind Turbines** - ten turbines up to 149.9m to blade tip with 4 revised turbine locations (T6, 7, 10 & 11) and 1 removed (T4). Refer to Table 1 in Chapter 2 for the revised grid coordinates. The candidate turbine remains the Senvion 114 3.4M and the total installed capacity would is nominally 34MW if that turbine was to be used. The MOD has requested that in the interests of air safety that all perimeter turbines should be fitted with 25 Candela omni-directional red lighting or infra-red lighting with an optimised flash pattern of 60 flashes per minute of 200ms to 500ms duration at the highest practicable point. Energiekontor would agree to a planning condition to install infra-red lighting.

ii. **Foundations** for the above mentioned turbines will also move. Where foundations are located on peat depth in excess of 2m they will be piled to ensure lower ground impact than conventional gravity foundations. The final piling technique would be

dependent on the ground conditions and would be subject to a geotechnical survey in the pre-construction phase. Turbines with gravity foundations would measure approximately 20m in diameter and presented in Figure 3.3 of the ES. Please refer to Appendix 11 for examples of piled foundations which could be used for the Over Hill turbine foundations in peat in excess of 2m. The design of the final piled foundation will be agreed with EAC and SNH following consideration of a detailed pre-construction geotechnical survey.

iii. **Inter Turbine Tracks** were revised to accommodate the 4 turbine movements and one turbine removal. Refer to Table 1, Chapter 2, of this FEI for details of track amendments to the original Proposed Development. The access tracks would have a running surface of 4.5 m with local widening at bends. A micro-siting allowance of 50 m either side of the tracks is proposed where possible. The actual running width would be dependent on final turbine selection and manufacturer requirements. Any tracks located on deeper peat will be of floated construction. A typical floated track cross section is shown as Figure 3.4 of the ES.

iv. **Access Track** extending from T10, in the north to join with the existing pylon line track, is proposed. This track routes south for approximately 900 m then veers west to join up with the existing pylon access track which would be upgraded to the above mentioned dimensions. This track would be constructed using the same construction technique as the above mentioned inter turbine tracks. The following is an approximate breakdown of the different types of track construction proposed but would ultimately be determined through more detailed geotechnical survey work in the pre-construction phase of the development:

- Floated Track: 8.2 km
- Cut Track: 0.3 km
- Existing and upgraded: 2.9 km
- Total track requirement is approximately 11.4 km compared to 9.2 km in the ES.

v. **Crane Pads** measuring 45 m x 25 m, at turbines 6, 7, 10 and 11 were subject to movements in accordance with the turbine movements. As noted in the ES, The precise design of the Crane Pads or hardstandings would be determined by the ground conditions at the turbine locations. Where peat depths of more than 1 m are encountered, the final geotechnical solution would be chosen for its sensitivity to peatland and agreed with SNH and EAC.

vi. **The Substation** is located to the south of T1 and measures 10 m x 15 m with a pitched roof height of 6.26m. The dimensions remain the same as in Figures 3.10-3.1 of the ES.

vii. **The Borrow Pit Area** measuring approximately 160 m x 120 m would, subject to further geotechnical investigation, provide a borrow pit for a source of aggregate for the construction of the Proposed Development infrastructure.

viii. **The Construction Compound** would comprise an area of hardstanding measuring 100 m x 50 m that would accommodate parking, offices and storage facilities. Figure 3.7 of the ES shows a plan layout.

ix. **Forestry Felling** has increased principally for the purposes of bog restoration and but also to accommodate the turbine and infrastructure amendments. More details on the tree felling can be found in Chapter 5 of this document.

x. **High Voltage and Control Cables** to form power and control circuits linking each turbine to the on-site substation, cables would be placed in trenches (dimensions to be determined by the ground conditions but typically 0.5 m by 1 m deep) typically routed alongside the tracks;

xi. **New Watercourse Crossings** for the proposed layout and access track design requires fifteen watercourse crossings. The design of each crossing would be informed by detailed surveys as part of the pre-construction process and it is proposed final details to be secured via a planning condition (see Figure 3.5 of the ES for a typical watercourse crossing design);

xii. **Ecology (Habitat) Management Plan** – A draft Habitat Management Plan has been produced as part of this application Appendix 6.1) and would seek to be undertaken in accordance with a condition imposed upon the planning consent;

xiii. **Peat Management Plan (PMP)** – a (Draft) PMP has been produced which forms the basis for a Full PMP to be agreed via condition imposed on the planning consent. This is contained in Appendix 4.4.

xiv. **Areas of Forestry Felling and Replanting** – an area of search has been identified as suitable for the compensatory planting (see Figure 5.3). Significant felling is

proposed as part of the peatland restoration process and further details can be found in the Habitat Management Plan Appendix and Chapter 5, the Forestry Assessment, of this FEI.

3.6 Energiekontor will employ best practice construction methods for peatland and this will be captured within a Construction and Environmental Management Plan (CEMP) to be agreed with EAC and in consultation with SNH.

Construction

3.7 Over Hill Wind Farm is likely to be operational by around 2022 and will operate for up to 25 years.

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Over Hill

FURTHER ENVIRONMENTAL INFORMATION CHAPTER 4: GEOLOGY, HYDROLOGY AND GEOHYDROLOGY ASSESSMENT

March 2018

4 Geology, Hydrology and Hydrogeology Assessment

Introduction

4.1 This chapter of the Over Hill Wind Farm Further Environmental Information (FEI) provides an assessment of the geological, hydrological and hydrogeological effects associated with the revised 10 turbine development ('Proposed Development'), as an update to the 11 turbine development detailed within the Over Hill Environmental Statement (ES) (5 June 2017). This FEI has been prepared on behalf of Energiekontor (the "Applicant") in respect of their Proposed Development at Over Hill.

4.2 This chapter has been written by MacArthur Green.

4.3 Since the production of the Over Hill ES, the design of the Proposed Development has been amended to take into account consultee comments. Turbine 4 (T4) located on the deepest peat has been removed from the layout. Four further turbines have been moved from the main peatland unit to achieve a more sensitive development proposal. The revised layout results in the new turbine locations being on equal or shallower areas of peat. Sections of the access track were re-designed to connect the revised turbine locations whilst minimising the impacts on peatland. Design iterations are detailed in Chapter 2.

4.4 This section of the FEI considers the effect to geological, hydrological and hydrogeological receptors as a consequence of the revised design of the Proposed Development. In addition, it provides supplementary information on the geology, hydrology and hydrogeology in relation to comments that have been raised by consultees. In particular, this chapter and associated appendices address comments in relation to:

- Groundwater Dependent Terrestrial Ecosystems (GWDTE); and
- Private Water Supplies (PWS).

4.5 Additional peat surveys were undertaken to inform this FEI. Phase 1 peat survey data was gathered around T7 where no infrastructure was previously located. Phase 2 peat survey data was gathered at all new areas of infrastructure. Peatland as a habitat is assessed in **Chapter 6: Ecology and Ornithology** of this FEI, and technical queries in relation to the draft Peat Management Plan (DPMP) are addressed in a revised draft DPMP provided in **Appendix 4.4**.

4.6 Technical queries in relation to the Peat Landslide Hazard and Risk Assessment, are detailed in **Appendix 4.5**.

4.7 This chapter is supported by the following Appendices. It is noted below where Appendices have been updated from the Over Hill ES Appendix 12 to inform this FEI:

- Appendix 4.1: Watercourse Crossings (updated)
- Appendix 4.2: Private Water Supply (updated)

- Appendix 4.3: GWDTE (updated)
- Appendix 4.4: Draft Peat Management Plan (DPMP) (updated)
- Appendix 4.5: Peat Hazard Landslide Risk Assessment (PHLRA) (updated)

Summary of Stakeholder Responses

4.8 A summary of stakeholder responses that relate specifically to geology, hydrology and hydrogeology are provided in **Table 4.1** below. This chapter refers to works undertaken in response to these stakeholder comments.

Table 4.1: Stakeholder Responses

Item of Correspondence	Comment	Actions Taken / Response
Scottish Environment Protection Agency (SEPA) Response to ES 08/08/2017	Points noted below relate to items relevant to the Geology, Hydrology and Hydrogeology Chapter. SEPA note the sensitivity of the development on Blanket Bog and recommended East Ayrshire Council (EAC) seek advice from SNH in this regard. Peat Management Plan: The detail provided in the draft PMP is recognised. Noting the potential for further design changes to occur, SEPA require a detailed Peat Management Plan to be issued to SEPA for agreement. This will be imposed as a planning condition. GWDTE: SEPA are satisfied that the development will not have a significant effect on GWDTE, however the access track and borrow pit should be designed to maintain hydrological connectivity and promote diffuse movement of water. Details would be provided within the CEMP and imposed through a planning condition. CEMP: A CEMP will be required as a planning condition. This should include pollution prevention measures particularly where working close to watercourses crossings. Sufficient GI analysis is required to identify areas of sewage sludge and confirm that the development will not have a detrimental effect to the water environment. Detailed pollution prevention and mitigation measures should be applied to all aspects of infrastructure.	SEPA have commented on all key aspects of the assessment. No objection was submitted and no further information was requested at this stage. SEPA note that further information including a ground investigation of the potential sewage sludge will be required as part of a CEMP. This will be imposed through a planning condition submitted following initial consent. CAR licence applications will be submitted prior to construction.

Item of Correspondence	Comment	Actions Taken / Response
	Groundwater abstractions: All PWS are identified as significantly out-with the buffer zones identified in SEPA's guidance note. No further work is requested. Flood Risk: Turbines, substation and construction compound are located a minimum of 50 m from the Black Water and its tributaries. SEPA are satisfied following review of SEPA flood maps that these elements are consistent with Scottish Planning Policy. It is acknowledged that watercourse crossings and tracks are aspects that can pose flood risk though note that necessary calculations for a 1 in 200 year flood flow will be submitted as part of the required CAR Licence application. SEPA are satisfied that the current undertaking in Appendix 12.1 are sufficient. An inspection and maintenance regime will be necessary. In addition to the above comments from SEPA additional detailed advice is provided including potential additional CAR licence requirements including dewatering of excavations and future licence requirements for discharge of surface water runoff. Recommendations on suitable road material are also noted that are suitable for the surrounding environment.	
Ironside Farrar on behalf of East Ayrshire Council Response to ES August 2017	Watercourse Crossings: The content of the report is satisfactory. Private Water Supply: Limited information has been provided on PWS identified. Two wells have been identified to the north of Nith Lodge that have not be considered in the assessment. Further information should be provided on the identified PWS, in particular the spring supply at Upper Beoch, which is the closest to the Development. GWDTE: Appendix 12.3 does not assess the impact from the borrow pit on nearby GWDTE ID's 24 and 6.	This chapter provides further information on relevant private water supplies and GWDTE in further detail.

Conclusions of the Over Hill Hydrology, Geology and Hydrogeology ES Chapter

4.9 The hydrological and hydrogeological receptors scoped in for assessment on the Over Hill ES comprised:

- Surface water as a direct receptor: sub-catchments of Black Water and Beoch Lane;
- Surface water as an indirect receptor: water supplies and flood risk;
- Groundwater: GWDTE and water supplies; and
- Peat hydrology.

4.10 The following receptors were scoped out of the Over Hill ES as sensitive receptors and remain scoped out of the FEI assessment:

- **Geology:** Likely significant environmental effects upon the geology of the Proposed Development Area during construction, operation and decommissioning phases have been scoped out. Based on a review of Scotland's Environment Map (http://www.environment.scotland.gov.uk/get-interactive/map-view/) there are no geological SSSI or other related designations, underlying the Proposed Development. Deep excavations (> 1 m) are required only at selected turbines and will be highly unlikely to alter the wider geological character of the area. Potential cumulative effects on geology have also been scoped out on this basis.
- **Water abstraction:** There is no requirement for water abstraction at the Proposed Development; water will be imported by tanker as required.

4.11 The potential effects of the following construction, operation and decommissioning impacts were assessed for all receptors scoped into the assessment:

- Pollution;
- Erosion and sedimentation;
- Increased runoff rates and volumes; and
- Reduced surface and groundwater volumes.

4.12 The residual likely significant environmental effects from the Over Hill ES are stated in **Table 4.2** below. There are no likely significant operational effects from the Proposed Development.

Table 4.2: Residual ES Effects

	Description	Pre-Mitigation Significance	Post-Mitigation Significance
Construction	Peat Hydrology and localised runoff rates and volumes	Major / Moderate	Major / Moderate
Decommissioning	Peat Hydrology and localised runoff rates and volumes	Major / Moderate	Major / Moderate

4.13 Pre-mitigation significance levels are based on the application of best practice construction methods, and, the proposed piling techniques for development on peat greater than 2 m in depth. Whilst this has minimised the volume of excavated peat (and its associated water store), the proposed engineering technique still requires removal of the uppermost 2 m. The associated run-off effects cannot be further mitigated whilst notable excavation is required; standard drainage proposals are restricted on surrounding areas of deep peat.

4.14 The proposals for piling should be reviewed as the Proposed Development progresses to detailed design and following the detailed geotechnical pre-construction surveys. Should piling techniques develop in a manner that allows peat to remain largely in-situ and undisturbed, the significance on the associated hydrology effects could be reduced.

Policy & Guidance

Changes since ES Submission

4.15 There has been a change to two referenced guidance documents since the submission of the ES as noted below:

- SEPA, Land Use Planning System Guidance Note 31, Version 3, September 2017: Version 3 of the Land Use Planning Guidance Note does not affect the approach to the assessment of GWDTE or groundwater abstractions, as applied in the ES. The buffer distances for assessment remain the same; further detail is provided on the assessment approach for any abstractions that may be found within the stated buffer.
- SEPA, The Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended), A Practical Guide, Version 8.2, February 2018: Whilst amendments to the CAR Licence requirements do not change the outcomes of the Environmental Impact Assessment (EIA), it is noted that a Complex Licence application will now be required prior to construction of the surface-runoff drainage system. The application will be made to SEPA.

Effects Assessed in Full

4.16 This FEI chapter specifically addresses queries regarding GWDTE and PWS from the Over Hill ES as raised by consultees (**Table 4.1**). This chapter also considers the effect of the revised layout on peat hydrology as a sensitive receptor.

Effects Scoped Out

4.17 The revised layout has resulted in the removal of one turbine on the deepest area of peat (T4) and the movement of four turbines to shallower areas of peat (T6, T7, T10 and T11). These turbines have been moved from the main peatland unit to achieve a more sensitive development proposal.

4.18 To access the revised turbine locations, an additional 2.2 km of floating track will be required. The new stretch of access track has been designed to traverse shallower areas of peat to the south-eastern side of the Proposed Development (and therefore avoid the main peatland unit).

4.19 As a result of the revised track layout, two watercourse crossings will be removed from the north of the Proposed Development (watercourse crossing 10 (WC10) and WC11). Four new watercourse crossings will be required along the new access track (WC14 – WC17), again within shallower areas of peat. In total 15 watercourses will be required; three upgrades to existing watercourse crossings and 12 new watercourse crossings.

4.20 The revised layout results in a negligible change to the overall impermeable footprint of the Proposed Development. All infrastructure (except watercourse crossings) remain out-with a 50 m buffer of the watercourses. Re-assessment of **flood risk** has therefore been scoped out of this FEI, though changes to the localised peat hydrology will be considered. The location of the four new watercourse crossings (WC14 – WC17) are shown in **Figure 4.1** and are referenced in **Appendix 4.1**. It is acknowledged that further information will need to be submitted to SEPA following detailed design of each watercourse crossing. 1 in 200 year peak flow calculations will also be submitted to SEPA, along with the CAR Licence applications for relevant watercourse crossings.

4.21 The magnitude of a potential **pollution** and **sedimentation** event on the upper reaches of **Black Water** and **Beoch Lane** were assessed as **Negligible** in the Over Hill Wind Farm ES. This is for both the construction and operational phases. This is of **Moderate/Minor significance** on the high sensitivity receptors of Upper Beoch and Black Water. **This is not significant under EIA regulations and does not require mitigation.** As the construction techniques and operational activities required for the Proposed Development have not changed as a result of the revised layout, re-assessment of the following potential impacts have been scoped out of the FEI and remain as assessed in the Over Hill ES:

- **Pollution** as a result oil/fuel/chemical pollution occurring as a result of accidental spillage or incorrect transport or storage of materials; and
- **Erosion and sedimentation** from unmanaged erosion and suspended solids generated from ground disturbance.

4.22 The detailed assessment of these impacts is provided in Chapter 12: Hydrology, Geology and Hydrogeology of Over Hill ES.

Assessment Methodology

4.23 This FEI retains the assessment methodology and significance criteria presented in the Over Hill ES (sections 12.21 to 12.32 of **Chapter 12: Hydrology, Geology and Hydrogeology**).

Baseline

4.24 The baseline as described in paragraphs 12.33 and 12.34 of **Chapter 12: Hydrology, Geology and Hydrogeology** applies to this FEI.

Description and Evaluation of Effects

4.25 The potential effect of the Proposed Development on groundwater flow paths and their indirect effect on GWDTE and PWS are considered here. The potential effect of the Proposed Development on peat hydrology is considered at the end of this section.

Groundwater Dependent Terrestrial Ecosystems

4.26 The effects of the Proposed Development on ecological features including GWDTE were detailed separately within **Chapter 9: Ecology, of the ES**, though an assessment of their groundwater dependency, was provided in **Appendix 12.3 in Volume 3 of the ES**.

4.27 Ironside Farrar Ltd (IFL) was appointed by EAC to review the information submitted by the Applicant in relation to groundwater dependent terrestrial ecosystems (GWDTEs). In their consultation response to EAC, IFL made the following points in relation to GWDTEs:

- *"…it appears that the borrow pit is located across GWDTE ID24 (moderately dominant), thereby separating it into two areas. It appears that the borrow pit will therefore affect this GWDTE and potential others nearby, in particular GWDTE ID6 (highly dominant), which is located further down gradient, by disrupting groundwater/surface water flow. The impact on nearby GWDTEs need to be assessed in further detail."*
- *"Section 12.7 refers to Figures A1 and A2 but it is unclear where these figures are presented."*
- *"Appendix 12.3 – The impact from the borrow pit on nearby GWDTEs and in particular GWDTE IDs 24 and 6 need to be assessed in further detail. Clarification should also be sought on Figures A1 and A2."*

4.28 For clarification, Figures A1 and A2 were presented in **Appendix 12.3**: **GWDTE Assessment** of the Over Hill ES. The figures illustrate the decision process applied to the assessment of GWDTE.

4.29 The potential effect of the Proposed Development on GWDTE IDs 24 and 6 is considered further below and in **Appendix 4.3**.

4.30 As referenced in the Over Hill ES, those GWDTEs considered to have groundwater potential are located around the existing access track and the proposed borrow pit search area. The borrow pit search area will require new ground excavation. GWDTE ID 24 was identified across the search area; this is a Moderately Dominant habitat indicating a lower likelihood of being influenced by groundwater.

4.31 The borrow pit is stated as being underlain by Scottish Coal Measures[1]; the underlying aquifer is of moderate productivity. However, the cyclic multi-layered aquifer produces

[1] BGS GeoIndex,, http://mapapps2.bgs.ac.uk/geoindex/home.html, accessed March 2018.

low yields from sandstones and higher yields where the land has been mined. **Figure 9.1** of the Coal Mining Risk Assessment identifies areas of historic open cast mining within the Proposed Development Boundary.

4.32 The borrow pit has not been subject directly to open-cast operations that would increase the potential groundwater yield from the underlying aquifer. However the area does appear to have been subject to mining related restoration activities, with restored material observed in this area during the peat probing survey. The restored material was observed to be a mix of peat and clays; **Appendix 4.4** provides a detailed consideration of the borrow pit location. Whilst not mined, the area is assessed as heavily modified with superficial deposits creating a waterlogged environment, rather than yielding notable groundwater.

4.33 GWDTE have also been identified within 250 m of the borrow pit search area (ID 6); these GWDTEs are again located on heavily modified areas and appear to trace fluvially driven forestry drains. Given the limited potential for those habitats surrounding the borrow pit search area to be groundwater dependent in this setting, the magnitude of an effect is still assessed as **Negligible** and of **Moderate/Minor significance** on the high and moderate sensitivity GWDTE receptors. **This is not significant under EIA regulations and does not require mitigation.** A detailed drainage design for all areas of infrastructure including the borrow pit, will be submitted as part of the CEMP.

4.34 The results of the full NVC survey are shown in **Figure 6.4** appended to **Chapter 6: Ecology and Ornithology.** The habitats have been classified as Highly Dominant, Highly Sub-dominant, Moderately Dominant and Moderately Sub-dominant GWDTE.

4.35 In accordance with SEPA Guidance[2], GWDTE have been re-assessed within 250 m of the revised T6, T7, T10 and T11 locations, and, within 100 m of the revised access track layout.

4.36 The GWDTE habitats have been reviewed for their likely groundwater dependency in this hydrological setting. Due to the highly porous nature of peat, a largely waterlogged environment is created. This waterlogged habitat creates what is often referred to as a perched water table, with reduced permeability. Consequently peat is considered to be largely disconnected from the true groundwater table below. On this basis, GWDTE surveyed on peat (greater than 0.5 m in depth) is scoped out as being an indicator of true groundwater. This approach was detailed in **Appendix 12.3** of the Over Hill ES. Where peat is less than 0.5 m, the habitat has been considered as potentially groundwater dependent, and reviewed against the other contributing factors.

4.37 Five notable GWDTE polygons have been identified along the new section of access track between the proposed borrow pit and T10. These polygons comprise Highly Sub-dominant habitats (ID 73 and ID 76) and Moderately Sub-dominant habitats (ID 35, ID 46 and ID 61) as shown on **Figure 4.7**. All habitats traverse areas of peat ranging from 0.2 m to 1.5 m. These habitats are in-fact located predominantly on peat between 0.5 m and 1.5 m. In this specific setting, these habitats are considered unlikely to be dependent on true groundwater. Despite the habitats being unlikely to be groundwater dependent, it is noted that the access track will be of a floating design due to the depth of peat present. Floating

[2] Land Use Planning System SEPA Guidance Note 31, Version 3, SEPA, September 2017.

the track provides mitigation for any potential disruption to groundwater flows and allows hydrological continuity across the area.

4.38 Two areas of Moderately Dominant GWDTE (ID 60 and ID 53) are located downslope of T7 and T11 and their associated tracks. A very small area of Highly Dominant GWDTE lies adjacent to ID 60. These three habitats have been reviewed further. The three polygons all align with surface watercourses not evident on Ordnance Survey (OS) mapping but visible on aerial imagery. They occur within the rides of plantation areas and appear to be driven by surface water rather than dependent on groundwater. The underlying hydrogeology has been reviewed. The habitats are underlain by Scottish Coal Measures[3]; the underlying aquifer is stated as being of moderate productivity. The cyclic multi-layered aquifer produces low yields from sandstones whilst it is noted that higher yields occur where the land has been mined. **Figure 9.1** of the Coal Mining Risk Assessment identifies areas of historic open cast mining within the Proposed Development Boundary, however historic mining is not reported as extending to these habitats. Lower yields are therefore anticipated. In addition, the area is overlain by superficial deposits of either shallow peat or glacial till which do not yield notable groundwater.

4.39 The access tracks within this area will be of a floating design and will therefore maintain the hydrological continuity. Excavations will be required at T7 and T11; given the limited potential for these habitats to be groundwater dependent in this setting, the magnitude of an effect is assessed as **Negligible** and of **Moderate/Minor significance** on the high and moderate sensitivity GWDTE receptors. **This is not significant under EIA regulations and does not require mitigation.**

Private Water Supplies

4.40 Licensed abstractions and PWS within 2 km of the Proposed Development were provided by SEPA and EAC respectively in March 2017. Details of the assessment were provided in **Appendix 12.2 of Volume 3 of the ES,** and all abstractions (and licensed discharges) within a 2 km radius were shown **on Figure 12.6 in Volume 2 of the ES**.

4.41 Ironside Farrar Ltd (IFL) was appointed by EAC to review the information submitted by the Applicant in relation to potential effects on Private Water Supplies (PWS). In its consultation response to EAC, IFL made the following points in relation to PWS:

- *"The Private Water Supply Assessment Appendix 12.2 does not adequately assess the impact of the development on the nearby PWS. Further details should be provided on the identified PWS, in particular the spring supply at Upper Beoch which is the closest identified PWS to the development."*
- *"Appendix 12.2 – A geological map should be produced showing the locations of the identified PWS. The OS mapped wells near Nith Lodge should be described within the assessment. The location of the Upper Beoch spring needs to be confirmed to assess the potential impact of the borrow pit on the PWS. Site verification visits should be undertaken to obtain additional information on all identified PWS."*

[3] BGS GeoIndex,, http://mapapps2.bgs.ac.uk/geoindex/home.html, accessed March 2018.

4.42 Further information on all PWS within 2 km of the Proposed Development is provided in **Appendix 4.2** of this FEI. The assessment considers the potential effect of the Proposed Development in relation to the revised layout.

4.43 Four properties are located with the 2 km search area, each with their own PWS:

- Upper Beoch;
- Knockenlee;
- Nith Lodge; and
- Meiklehill.

4.44 Since submission of the Over Hill ES, the location of the spring source has been confirmed by the resident at Upper Beoch. A PWS questionnaire was issued during the EIA and a subsequent request made by the Applicant to re-visit the property. Access was not granted and this request has been respectfully acknowledged. Information on the source location was however supplied by the resident, with a 'water source' location marked on a map.

4.45 The location has been digitised and based on the reference map is located 40 m to the south of the property at National Grid Reference (NGR) NS 52172 10226 (**Figure 4.6**). The spring is located on Scottish Coal Measures[4]; the underlying aquifer is stated as being of moderate productivity (**Figure 4.4**). The cyclic multi-layered aquifer produces low yields from sandstones whilst it is noted that higher yields occur where the land has been mined. **Figure 9.1** of the Coal Mining Risk Assessment identifies areas of historic open cast mining within the Proposed Development Boundary, however these areas does not extend as far as Upper Beoch. The spring catchment is assessed as being relatively localised; further information is provided in **Appendix 4.2**.

4.46 The potential hydrological pathway between the Proposed Development and the four PWS abstractions has been reviewed. Knockenlee, Nith Lodge and Meiklehill are located within a separate hydrological catchment to the Proposed Development on low yielding aquifers (**Appendix 4.2**). The PWS are not considered to be effected by the Proposed Development. Upper Beoch is assessed as being supplied by a localised spring, with a low likelihood of being hydrologically connected any areas of infrastructure. There is considered to be no significant effect to the supply based on the geological information available. It is recommended that a Private Water Supply Risk Assessment is completed at Upper Beoch, after the results of Ground Investigation are available, including any further information on the location of potential sewage sludge in this area. This will be enforced as a Planning Condition to the Proposed Development.

4.47 The relevance of the CAR Licence abstractions was queried by IFL. The abstractions, whilst not domestic, are privately registered and are considered as part of a wider assessment undertaken to ensure any groundwater abstractions (public or private), are not affected by the Proposed Development. The abstractions are not affected by the revised infrastructure layout and have been scoped out of any further assessment in **Appendix 4.2**.

[4] BGS GeoIndex,, http://mapapps2.bgs.ac.uk/geoindex/home.html, accessed March 2018.

Peat Hydrology

4.48 As a result of the revised layout, T4 has been removed from the deepest area of peat (> 4m). In addition, three turbines located on peat between 3 m and 4 m have all been re-sited. The revised layout results in two turbines being on peat < 1 m, three turbines on peat between 1 – 2 m and five turbines being on peat between 2 – 3 m.

4.49 The revised layout has been designed to reduce the potential effects on peatland habitat **(Chapter 6: Ecology and Ornithology)**. As a consequence, the **spatial extent** of the potential effects on peat hydrology are reduced.

4.50 Due to five turbines remaining on peat between 2 m to 3 m in depth, the magnitude of a potential effect from water released from the peat is still assessed as **Moderate** at the turbine locations. This is due to the direct loss of a water store at the turbine locations, and, potential dewatering of surrounding peatland areas. Whilst the likely significant environmental effect may be localised and potentially temporary, it is still classified as being **of Major/Moderate significance** on the high sensitivity receptor. **This is significant under EIA regulations and requires mitigation.** This remains as per the Over Hill ES.

4.51 It is noted that the magnitude of the effect may be less during summer months when the wider peatland area is not saturated, however, avoidance of construction during wet weather is assumed unavoidable. Sudden release of water could cause an increase in runoff to watercourses and potentially localised and temporary flooding around immediate areas of the upper catchments. Water should be pumped to flatter areas where the water can disperse allowing some attenuation of flow. Dependent on the volume of water and dilution factor, there may also be a temporary change in water quality.

Additional Peat Depth Survey Data

4.52 SNH has requested that additional peat survey information for the proposed substation location is submitted. The survey method is detailed in **Chapter 6: Ecology and Ornithology** of this FEI. The additional survey captures peat depths across the revised areas of infrastructure, in addition to the substation.

4.53 The results of the survey are shown on **Figures 4. 8** (Phase 2 Peat Probing and Coring Sample Locations) and **4.9** (Phase 2 Interpolated Peat Depth Map). The additional peat probing data is discussed further in the updated Draft Peat Management Plan (DPMP) included in **Appendix 4.4**. The excavations volumes in the updated DPMP represent the revised layout of the Proposed Development.

4.54 The carbon calculator has also been updated to reflect the revised layout of the Proposed Development and is provided in **Appendix 3.1**.

Peat Landslide Hazard and Risk Assessment

4.55 An updated Peat Hazard Landslide and Risk Assessment is included in **Appendix 4.5**.

Summary

4.56 The potential for the revised layout to affect peat hydrology has been assessed based on the revised infrastructure layout.

4.57 The revised layout removes all turbines from areas of peat greater than 3 m in depth. This reduces the potential cumulative effect across the Proposed Development.

4.58 Five turbines remain on peat between 2 m and 3 m in depth. It was recognised in the Over Hill ES that proposals for piling should be reviewed as the Proposed Development progresses to detailed design. SEPA did not object to the previous layout and will be informed of any further changes in the proposed construction techniques. Should piling techniques develop in a manner that allows peat to remain largely in-situ and undisturbed, the significance on the associated hydrology effects could be reduced.

4.59 The residual likely significant environmental effects remain as stated in **Table 4.3**: below. The residual effects are likely to be local and temporary. There remain no likely significant operational effects from the Proposed Development.

Table 4.3: Residual Effects

	Description	Pre-Mitigation Significance	Post-Mitigation Significance
Construction	Peat Hydrology and localised runoff rates and volumes	Moderate	Moderate
Decommissioning	Peat Hydrology and localised runoff rates and volumes	Moderate	Moderate

Over Hill

FURTHER ENVIRONMENTAL INFORMATION
CHAPTER 5: FORESTRY ASSESSMENT

March 2018

5 Forestry Assessment

Introduction

5.1 This section of the FEI provides supplementary information on forestry matters in relation to the revised Proposed Development described in Chapter 3, Project Description.

5.2 In particular, this section updates Chapter 13 Forestry, of the ES to take account of the revised proposals for felling, restocking and forest management proposals as a result of the proposed amendments to the turbine and infrastructure layout and the revised Draft Habitat Management Plan outlined in Appendix 6.1 of this FEI. Those parts of Chapter 13 of the ES which are not updated below remain current and relevant.

Updated Felling Plan

5.3 The Proposed Development wind farm felling plan is shown in Figure 5.1 of the FEI and summarised in Table 5.1 below.

Table 5.1: Wind Farm Felling Plan

Felling Phase	Area (ha)	Area (%)
No felling	399.9	60.2%
Fell Phase 1: 2017-2021	88.8	13.4%
Respacing for habitat management	3.7	0.6%
Long term retentions	4.3	0.6%
Natural reserves	9.2	1.4%
Outside plan period	158.0	23.8%
Totals	**663.94**	**100.00 %**

5.4 Part of the felling is proposed for habitat mitigation purposes, which is identified separately on the felling plan. This felling is described in detail in Chapter 6: Ecology & Ornithology of this FEI document submission. This includes areas of clearfell and respacing as shown on Figure 5.1 of specific coupes for habitat management purposes. It has been assumed that up to 40 % of the areas would be respaced to a variable density and depth from the external edge next to the peatland to create habitat improvements for black grouse.

5.5 There would be an increase of 88.8 ha in the felling programme during Phase 1 (2017 - 2021) due to the Proposed Development felling plan. There would be no further felling as a result of the Proposed Development

Updated Restocking Plan

5.6 The current species plan has been amended to integrate the Proposed Development infrastructure and habitat management requirements into the forest design and to take account of the site conditions. The wind farm restocking plan is shown in Figure 5.2 and summarised in Table 5.2 below. This includes areas of on-site compensatory planting to

offset the loss of woodland area resulting from the Proposed Development as shown in Figure 5.3.

Table 5.2: Wind Farm Restock Species Composition

Species	Abbreviation	Area (ha)	Area (%)
Habitat management	HMP	60.8	9.2%
Mixed broadleaves	MB	7.5	1.1%
Mixed conifer	MC	188.2	28.4%
Open ground	OG	375.7	56.6%
Respacing for habitat management	RSP	3.7	0.6%
Wind farm open ground	W/F OG	28.0	4.2%
Totals		**663.9**	**100 %**

5.7 The baseline current species and wind farm restocking data have been analysed to assess the changes construction of the Proposed Development would have on the species composition of the forest. These data are presented in Table 5.3 below. The data is shown as a percentage of the Forestry Study Area.

Table 5.3: Comparison of Baseline Species and Wind Farm Restock Plans

Species	Abbreviation	Baseline	Wind Farm	Difference	
		Area (ha)	Area (ha)	Area (ha)	Area (%)
Habitat management	HMP	0.0	60.8	60.8	9%
Mixed broadleaves	MB	6.3	7.5	1.2	0%
Mixed conifer	MC	257.7	188.2	-69.5	-10%
Open ground	OG	399.9	375.7	-24.2	-4%
Respacing for habitat management	RSP	0.0	3.7	3.7	1%
Wind farm open ground	W/F OG	0.0	28.0	28.0	4%
Totals		**663.9**	**663.9**		

5.8 The changes in the structure of the woodlands are discussed below. The changes refer to a comparison of the wind farm restocking plan against the baseline restocking plan:

- An area of 88.8 ha would be felled as a result of the construction of the Proposed Development;
- An area of 24.2 ha has been identified for on-site compensatory planting;
- 3.7 ha of conifer woodland will undergo respacing for habitat management;
- There is a net reduction in the area of conifer woodland of 65.8 ha; offset by an increase in broadleaf woodland of 1.2 ha; and

- As a result of the woodland re-design, the stocked area of woodland in the Forestry Study Area would decrease under the wind farm restocking proposals by 64.6 ha of which 60.8 ha is for peatland restoration.

Requirement for Compensatory Planting

5.9 The revised wind farm restocking plan considers the site conditions and concurs with the recent Supplementary Guidance to support FCS Forests and Peatland Habitats Guideline Note (2000) issued in June 2014. This supplementary guidance states that where the site is a priority for habitat restoration on ecological grounds, conventional restocking would not be required. This applies to sites that can be restored to improve the condition or connectivity of associated priority habitats (including bog woodlands and other forms of native woodland or scrub such as fen peats and bogs). This acceptability for a change in land use, without compensatory planting, applies to peat of all depths. It acknowledges most priority habitat restoration will be to open habitat, but there may be instances where it is ecologically appropriate and achievable to restore to native woodland or bog.

5.10 It is considered that peatland restoration over an additional 60.8 ha of the Proposed Development area as part of a HMP satisfies the criteria of the Control of Woodland Removal Policy – "woodland removal without a requirement for compensatory planting - enhancing priority habitats and their connectivity and enhancing populations of priority species". It further supports local and national policies regarding the restoration of bog habitats.

5.11 Following the guidance relating to the implementation of the Control of Woodland Removal Policy, considering the conversion of woodland area to peatland restoration and other minor changes to the wind farm restocking plan, the construction of the Proposed Development would result in a net loss of woodland area. This is summarised in Table 5.4 below.

Table 5.4: Woodland Loss Calculation

Woodland Category	**Baseline Species**	**Wind Farm Restocking Species**	**Difference**
	Area (ha)	**Area (ha)**	**Area (ha)**
Stocked woodland	264.0	199.4	-64.6
Woodland removal not requiring compensatory planting	0.0	60.8	60.8
Unstocked woodland	399.9	403.7	3.8
Totals	**663.9**	**663.9**	

5.12 Taking into account the on-site compensatory planting and the woodland removal not requiring compensatory planting the Proposed Development would lead to a net loss of woodland area of 3.8 ha.

5.13 Energiekontor is committed to providing appropriate compensation planting. The extent, location and composition of such planting to be agreed with Forestry Commission

Scotland, taking into account any revision to the felling and restocking plans prior to the commencement of construction.

Summary

5.14 The total Forestry Study Area extends to 663.9 ha and is comprised of privately owned and managed woodlands.

5.15 An area of 88.8 ha would be felled as a result of the construction of the Proposed Development.

5.16 An area of 24.2 ha has been identified for on-site compensatory planting.

5.17 An area of 60.8 ha has been identified for peatland restoration and therefore would not require compensatory planting.

5.18 There would be a net loss of other woodland area of 3.8 ha.

5.19 In order to comply with the Scottish Government's Control of Woodland Removal Policy, off-site compensation planting would be required by legal agreement attached to any consent. The Applicant is committed to providing appropriate compensation planting to replace the loss of woodland area.

References

5.20 Additional references to those listed in ES Chapter 13 are listed below.

Forestry Commission Scotland (2000): FC Forests and Peatland Habitats Guideline Note. Edinburgh.

Forestry Commission Scotland (2014): Supplementary guidance to support FC Forests and Peatland Habitats. Edinburgh.

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Over Hill

FURTHER ENVRONMENTAL INFORMATION CHAPTER 6: ECOLOGY AND ORNITHOLOGY ASSESSMENT

March 2018

6 ECOLOGY & ORNITHOLOGY ASSESSMENT

Introduction

6.1 This chapter of the Over Hill Wind Farm Further Environmental Information (FEI) provides an assessment of the ecological and ornithological impacts associated with the revised 10 turbine development, as an update to those detailed within the Over Hill ES (5 June 2017) which presented an assessment of an 11 turbine wind farm. This chapter also provides a description and consideration of the further peat depth studies that have been undertaken since the submission of the Over Hill ES and addresses any outstanding ornithology or ecology issues arising from the Over Hill ES. This FEI has been prepared on behalf of Energiekontor (the "Applicant") in respect of their proposed development at Over Hill.

6.2 This chapter has been written by MacArthur Green.

6.3 Since the production of the Over Hill ES, the layout of the wind farm has been amended to take into account consultee comments. Changes to the wind farm design (and the development of them during consultation) are presented in Chapters 2 and 3.

6.4 This FEI chapter and associated Appendices address the following issues which consultees have raised in response to the Over Hill ES:

- The design of the wind farm has been revised to reduce impacts on peatland habitats.
- The draft Habitat Management Plan has been updated in accordance with advice from SNH and RSPB.
- Further peat depth surveys have been completed of the revised layout to inform this FEI and an updated draft Peat Management Plan.

6.5 In addition to the above, any change in impact to valued ecological and ornithological receptors as a consequence of the revised wind farm design is considered within this FEI.

6.6 This chapter is supported by the following Appendices. It is noted below where Appendices have been updated or created to inform this FEI. Where no updates have been made, the ES Appendix location is referenced.

6.7 Ornithology:

- Appendix 8.1: Annexes A, B, C, D & E: Ornithology

6.8 Ecology:

- Appendix 9.1 National Vegetation Classification (NVC) Survey Report
- Appendix 9.2 Protected Species Survey Report
- Appendix 9.3 Bat 2014 Survey Report
- Appendix 9.4 Bat 2015 Surveys At Height Report
- Appendix 9.5 Bat 2016 Survey Report

- Appendix 9.6 Over Hill Ecological Appraisal
- Appendix 9.7 Draft Species Protection Plan
- Appendix 6.1 Outline Habitat Management & Research Plan (Updated for FEI)
- Appendix 6.2 SNH and RSPB Correspondence (New for FEI)

6.9 All figures associated with the Ecology and Ornithology ES Appendices (Appendices 8 and 9 of the Over Hill ES) have been updated for this FEI to show the revised infrastructure layout. Reference should therefore be made to these updated figures when consulting this FEI.

Summary of Stakeholder Responses

6.10 A summary of stakeholder responses that relate specifically ecology and ornithology is provided in Table 6-1 below. This chapter refers to works undertaken in response to these stakeholder comments

Table 6.1: Stakeholder Response

Item of Correspondence	Comment	Actions Taken / Response
Scottish Natural Heritage Response to ES 31/08/2017 Email of 06/10/2017 (referred to in table where relevant) Email of 19/12/2017 (referred to in table where relevant) Email of 07/02/2018 (referred to in table where relevant)	**Peat/Peatland:** Object due to the wind farm's potential impacts on the nationally important carbon-rich soils, deep peat and priority peatland habitat which are present on the site. Significant effects of the proposal on this area have not been substantially overcome through siting, design or other mitigation, as required by Scottish Planning Policy. May reconsider position if proposal is amended to safeguard peat/priority peatland habitat. -Review alteration of infrastructure and construction requirements in peatland areas. - Revised habitat management proposals which increase the area of peatland habitat to be restored. SNH disagree with the nature conservation value attributed to blanket bog in the ES: 'Table 9-31 of the ES identifies the blanket bog and associated wet modified bog which it supports as being of regional value based on its extent, quality and being one of the best examples of this type of habitat within the wider area. This aspect of the assessment does not take sufficient account of the importance	The layout of the wind farm has been revised to reduce impacts on peat/priority peatland. Revised layout has been developed in consultation with SNH (Email of 19/12/17 and 07/02/18) and outlined in chapter 2. The revised layout is described in chapter 3, Project Description. The draft Habitat Management Plan (Appendix 4.4) has been updated to take SNH's comments into account – these are below. This chapter considers the value of blanket bog at this Over Hill site in further detail.

Item of Correspondence	Comment	Actions Taken / Response
	given in SPP to carbon-rich soils, deep peat and priority peatland habitats, nor to the additional context and information provided by documents such as the Scottish Government's Draft Climate Change Plan and Draft Peatland and Energy policy statement or in Scotland's National Peatland Plan. In this context, and for the reasons identified in the ES, taken together we consider the area of Class 1 peatland and the blanket bog habitat it supports to be a nationally-important resource.'	
	The borrow pit is not located in a peatland area, therefore SNH consider it is not appropriate to consider this site for peatland restoration.	Updated peat depth surveys have been completed on the site including the proposed borrow pit location. The updated peat depth survey found that depths range from 6-66cm in this area. The dPMP considers the rational for restoring peat-edge woodland in this area.
	Further peat probing is required at the proposed sub-station site.	This has been completed and updated results provided in Figure 4.8.
	An updated draft Peat Management Plan should be submitted.	Response to initial queries to PMP provided in letter to SNH of 06 September 2017 (Appendix 6.2). An updated draft PMP is provided in Appendix 4.4 to the FEI.
	An updated Peat Landslide Hazard Risk Assessment should be submitted.	This is provided in Appendix 4.5 to the FEI.
	Habitat Management: <u>Management Unit A - Wet Modified Bog and Blanket Bog (Unplanted):</u> Clarification on Prescription 1.2 of 'prohibited activities'. 'We note that the objective of increasing *Sphagnum* and the objective of increasing dwarf shrubs may be incompatible as they have opposing habitat requirements – wetter for *Sphagnum* and drier for dwarf shrubs)'.	These are included to ensure that potentially damaging activities, which would potentially prevent the objectives being achieved, are not undertaken within the HMP area in the future. These activities are not currently taking place on site. Over grazing by deer can reduce sphagnum abundance and dwarf shrub abundance.

Item of Correspondence	Comment	Actions Taken / Response
	'We also advise that an objective to remove self-seeded trees from areas of open bog should be included in the plan. We recommend that this is carried out every five years over the lifetime of the development'	The Outline Habitat Management & Research Plan (OHMRP) has been updated to include this.
	SNH email of 06 October 2017: SNH suggest the following activities should occur in Management Unit A: — Blocking drains at north end of site. — Blocking erosion gullies – even if vegetated - to raise water table of adjacent peatland. — Removal of regenerating trees (we note that this is now included in the plan though and we welcome that). — As above, addressing restoration needs of felled forestry in the west of site as appropriate.	The OHMRP has been updated to include this advice.
	<u>Management Unit B - Wet Modified Bog and Blanket Bog (Planted):</u> A greater area of tree removal is required to compensate for the impact to blanket bog. Care will be required to ensure that forest felling activities do not adversely impact bog and associated vegetation.	88.8 ha of trees are now proposed to be removed. This is equivalent to a compensation ratio of 1:29 (assuming no indirect loss of blanket bog and modified bog) or 1:8 (assuming indirect loss of blanket bog and modified bog is a total loss). See Appendix 6.14.
	<u>Management Unit C - Native Broadleaved Woodland:</u> We advise that the area identified as Management Unit C in Figure 9.11 Outline Habitat Management and Research Plan appears to be incorrect as it is a simple rectangle in an area of, and surrounded by *Sphagnum*-rich blanket bog (NVC community M18a). This would not be an appropriate area for woodland creation and the intentions here should be clarified.	Clarification detailed in letter to SNH of 06 September 2017 (Appendix 6.2).
	Protected Species: The mitigation measures set out in the ES to be implemented.	Comments noted.

Item of Correspondence	Comment	Actions Taken / Response
	A requirement for the development to be carried out in accordance with an approved Species Protection Plan (SPP).	
	Bats: 'We also welcome the intention to undertake pre and post construction monitoring of bat activity to refine the need for any additional mitigation. We advise that the scope of this monitoring should be submitted to and approved by the planning authority, in consultation with SNH, prior to any works beginning on site'. 'We additionally advise that the rotation of turbine blades below cut in-speed should be minimised through feathering to further reduce the potential for the development to significantly impact on bats' 'we advise that the centre of the turbine towers should not be located closer than 78.23m to adjacent woodland edges. The minimum stand-off of 50m should also apply between turbine blade tips and the Black Water, given the findings of the 2014 and 2016 bat surveys, but it is likely that this can be achieved'	Comments noted. This chapter considers whether the revised wind farm design affects potential impacts on bats.
	Birds: If a breeding bird protection plan and proposed black grouse mitigation is adopted then the development is 'unlikely to have any adverse effects on birds'. 'Further information on hen harrier and peregrine should be obtained from the local Raptor Study Group prior to monitoring of the site, should the proposal receive planning permission'	Comments noted. This chapter considers whether the revised wind farm design affects potential impacts on bats.
	Deer: 'Should the proposal receive planning permission, we advise that an assessment of the potential impacts on deer welfare, habitats, neighbouring and other interests (e.g. access and recreation, road safety, etc.) should be submitted for approval by the planning authority, in consultation with SNH'.	Comments noted.
	Freshwater interests: 'Before the application is determined, we advise that supporting data should	

Item of Correspondence	Comment	Actions Taken / Response
	be sought from the relevant District Salmon Fisheries Boards and Fishery/River Trusts to support the observations made in the ES that fish habitats are either absent or that watercourses do not support fish'.	See comments below regarding Ayrshire Rivers Trust and Nith District Salmon Fisheries Board.
RSPB Scotland Response to ES 27/07/17 Email of 19/12/17 (referred to in table where relevant)	Object due to: Direct and indirect impacts on blanket bog. Loss and damage to Martyrs Moss Provisional Wildlife Site (pWS) for blanket bog. Impact on deep peat/ carbon rich soils. The peatland habitats at the site have an important value as a carbon store. Predicted significant impacts on peat undermine the climate benefits of the windfarm. The windfarm could adversely affect local populations of black grouse and snipe, however these may be mitigated for through a Habitat Management Plan. RSPB made the following recommendations: Removal or re-siting of turbines 1, 3, 4, 6, 7, 9 and 10 (ES Fig 12.1 A) and their accompanying access roads away from areas of blanket bog habitat and deep peat. For some of the turbines, this might only involve setting them further back from the peatland. Re-visit the outline Habitat Management Plan with the aim of managing the wider peatland site as a whole, to include removing significant additional areas of forestry from deep peat. Of particular importance would be the potential to remove the forestry block around proposed turbine 6 in its entirety.	Turbine 4 removed and 6, 7, 10 & 11 relocated to address RSPB concern. See Chapter 2 for full details of design changes. Comments noted. Updated draft OHMRP included as part of this chapter in Appendix 6.1. See response to SNH above on similar comment.
Scottish Wildlife Trust July 2017	Object due to impacts on blanket bog. The proposed construction mitigation measures and restoration of blanket bog, by felling areas of commercial	See comments responding to similar point from SNH.

Item of Correspondence	Comment	Actions Taken / Response
	forestry, would not fully compensate for the impact on blanket bog.	
Ayrshire Rivers Trust 24/07/2017	Potential impact on fisheries interests within the tributaries of the River Ayr. Request before, during and after fisheries and invertebrate monitoring within relevant tributaries.	Recommendations for planning condition for future fisheries monitoring noted.
Nith District Salmon Fisheries Board Email 15/06/2017 Email 29/06/2017	Objected due to lack of background information and potential impact on the Nith. Confirm removal of objection subject to planning condition requiring monitoring of fisheries interests.	Email issued to Nith DSFB on 22nd of June explaining consideration of fisheries interest in the ES. Recommendations for planning condition for future fisheries monitoring noted.
New Cumnock Community Council Email 27/07/2017	'Over Hill will damage over 16 hectares of blanket bog, which has been identified as 'one of the best examples of this type of habitat' within the wider area and is considered of regional nature conservation value. Martyrs Moss is also identified in the North Kyle Forest Masterplan as a strategic peat Wetland area (PE4), which we support. ..We feel that Martyrs Moss should be given protected status, as habitat of this quality, is continuously under threat and cannot be 'repaired'.'	See above response. Comments similar to RSPB and SNH's comments on peatland above.

Conclusions of the Over Hill Ecology and Ornithology ES Chapters

6.11 The 'Important Ecological Features' and 'Valued Ornithological Receptors' scoped in for assessment on the Over Hill ES comprised:

- Black grouse, goshawk and snipe (ornithology).
- Wet modified bog and blanket bog (ecology).
- Bats (ecology).

6.12 Table 6.2 below summarises the potential effects, mitigation proposed and residual effects as stated in the Over Hill ES Ecological Assessment.

Table 6.2: Summary of Conclusions of Over Hill ES Ecological Assessment

Impact	Significance	Mitigation	Significance of Residual Effect
Construction			
Direct and Indirect Impact Modified Bog and Blanket Bog	Moderate	A pollution prevention measures and best practice construction methods will be agreed with stakeholders prior to construction. An ECoW will oversee construction process. Prescriptions within OHMRP. Habitat management prescriptions to include removal of plantation forest, restoration of bog habitats, removal of conifer regrowth and drainage blocking as well as long-term monitoring and habitat management over the operational phase. A detailed research project to assess the impact of wind farm infrastructure on peatland will be undertaken.	Not significant
Disturbance to Bat species	Negligible	None required, but, best practice construction methods and a Species Protection Plan will be agreed with stakeholders prior to construction. An ECoW will oversee construction process.	Not significant
Operational			
Nyctalus spp.(Collision)	Minor adverse	Maintenance of minimum stand-off distance between turbines and woodland edges through design. Tree planting prescription within OHMRP to provide woodland/edge habitat away from the turbine area. A pre-commencement and operational monitoring programme for Nyctalus bat activity; and production of a Species Protection Plan.	Not significant
Myotis and brown long-eared bat spp. (Collision)	Negligible	Maintenance of minimum stand-off distance between turbines and woodland edges through design. Tree planting as detailed within the Forest design Plan and reflected in the OHMRP to provide woodland/edge habitat away from the turbine area and production of a Species Protection Plan.	Not significant
Soprano and common pipistrelle (Collision)	Minor adverse	As above	Not significant
Decommissioning			
As per construction	As per construction	As per construction	As per construction

6.13 Table 6-3 below summarises the potential effects, mitigation proposed and residual effects as stated in the Over Hill ES Ornithological Assessment.

Table 6.3: Summary of Conclusions of Over Hill ES Ornithological Assessment

Impact	Significance	Mitigation	Significance of Residual Effect
Construction (Habitat Loss Disturbance)			
Black grouse	Moderate	Surveys for lekking black grouse will be completed during, or immediately prior to, the construction phase in March, April and May. Should any leks be identified within the Proposed Development Area or a 750m buffer, a 750m disturbance buffer will be established and no activity should occur in these areas during the periods prior to 9am and after 6pm within the black grouse breeding season, April - July. A maximum speed limit of 15 mph will be enforced, and personnel will remain within vehicles wherever possible within 750m of leks. Any construction activity (e.g. track widening) required along access tracks should take place outside of the black grouse breeding season (April to July) if possible, or if not, at least 750m from lek sites and/or outside of the daily lekking period as described above. Where possible, gates within 750m of lek sites will remain open after first arrival, therefore avoiding every subsequent entry to open and close the gate and the associated potential disturbance to the lek due to pedestrian activity. The Ecological Clerk of Works (ECoW) should oversee the implementation of the above measures.	Not Significant
Goshawk	Moderate/Minor	Pre-construction surveys will be undertaken and a Bird Protection Plan will be approved prior to construction commencing.	Not Significant
Snipe	Negligible	A Bird Protection Plan will ensure breeding birds are protected during construction.	Not Significant
Operation: Displacement			
Black grouse	Moderate	Habitat management measures are proposed in the draft Habitat	Not Significant

Impact	Significance	Mitigation	Significance of Residual Effect
		Management Plan including improving dwarf shrubs, tree/shrub planting and thinning of sitka spruce plantation.	
Goshawk	Minor	None required.	Not Significant
Snipe	Negligible	Blanket bog restoration will improve habitat for Snipe.	Not Significant
Operation: Collision risk			
Black grouse	Negligible	Habitat Management Plan.	Not Significant
Goshawk	Negligible	None.	Not Significant
Snipe	Negligible	Habitat Management Plan.	Not Significant

Policy & Guidance

Changes since the Over Hill ES

6.14 There has been one change (noted below) to ornithology and none to ecology related guidance since the submission of Over Hill ES.

- Assessing Significance of Impacts from Onshore Wind Farms out-with Designated Areas (updated February 2018): The changes do not affect the ornithology assessment conclusions within the Over Hill ES.

Consideration of Peatland Policy and Guidance

6.15 SNH noted in their consultation response (31 August 2017) that the Over Hill wind farm ES '*does not take sufficient account of the importance given in SPP (Scottish Planning Policy) to carbon-rich soils, deep peat and priority peatland habitats, nor to the additional context and information provided by documents such as the Scottish Government's Draft Climate Change Plan and Draft Peatland and Energy policy statement or in Scotland's National Peatland Plan*'. Further consideration of these documents and their relevance to Over Hill is provided below.

6.16 The Carbon and Peatland map 2016[1] has been developed as 'a high-level planning tool to promote consistency and clarity in the preparation of spatial frameworks by planning authorities[2]'. It identifies areas of 'nationally important carbon-rich soils, deep peat and priority peatland habitat' as 'Class 1' and 'Class 2' peatlands. The Scottish Planning Policy[3] (SPP) explains that, 'Recognising the need for significant protection, in these areas wind farms may be appropriate in some circumstances. Further consideration will be required to demonstrate

[1] http://map.environment.gov.scot/Soil_maps/?layer=10

[2] https://www.nature.scot/professional-advice/planning-and-development/general-advice-planners-and-developers/planning-and-development-soils/carbon-and-peatland-2016-map

[3] https://beta.gov.scot/publications/scottish-planning-policy/documents/00453827.pdf

that any significant effects on the qualities of these areas can be substantially overcome by siting, design or other mitigation'.

6.17 Over Hill wind farm is located on an area identified as nationally important 'Class 1' carbon-rich soil, deep peat and priority peatland habitat. SNH guidance on spatial planning[4] states that, 'The location of a proposal in the mapped area does not, in itself, mean that the proposal is unacceptable, or that carbon rich soils, deep peat and priority peatland habitat will be adversely affected. The quality of peatland tends to be highly variable across an application site and a detailed assessment is required to identify the actual effects of the proposal'. A 'detailed assessment' (peat depth and NVC surveys) has been undertaken at Over Hill to establish the actual extent of Class 1 and 2 peatlands and these can be defined as unplanted areas with over 0.5m of peat shown in Figure 4.9. Areas of forestry located on over 0.5m depth of peat would fall within Class 5 and would have been part of the original blanket bog habitat before afforestation in 1994/95. These areas have potential for restoration back to priority peatland habitat.

6.18 Scotland's Draft Peatland and Energy policy statement[5] '*provides a common basis from which the Scottish Government and its agencies act in developing and implementing policies in relation to peatland and energy*'. Its principle aim is, '*to maximise greenhouse gas emissions abatement in the way best designed to deliver multiple benefits. All policies and plans in relation to peatland and energy flow from this overarching aim*'. The policy statement details eight core principles to support this aim, whilst all are relevant to onshore wind projects, two key principles with regard to Over Hill are:

- '*Decisions on land use change should seek to support delivery of the Scottish Government's targets for peatland restoration and renewables deployment, making full use of the decision support tools available to balance carbon emissions savings and other benefits*'
- '*Land use practices should seek to avoid peatland disturbance as far as possible. Where the disturbance of peat is unavoidable, such disturbance should be minimised and managed in line with good practice guidance, and restoration activities implemented as early and fully as possible*'.

6.19 The Land Use Strategy for Scotland[6] (a requirement of the Climate Change (Scotland) Act 2009), sets out ten principles for sustainable land use and identifies peatland restoration as a means to lock up carbon and contribute to climate mitigation.

6.20 Scotland's National Peatland Plan[7] sets out Scotland's vision for peatlands as an important economic, social and environmental asset. In meeting its Vision, the principle aim is to, '*Protect, manage and restore peatlands to maintain their natural functions, biodiversity and benefits*'.

6.21 The Draft Climate Change Plan[8] explains that, '*Peatlands cover around 20% of land in Scotland or around 1.7 million hectares…However, it is currently estimated that over 600,000 hectares of*

[4] https://www.nature.scot/sites/default/files/2017-06/A1663759.pdf
[5] http://www.gov.scot/Resource/0050/00502389.pdf
[6] http://www.gov.scot/Resource/0050/00505253.pdf
[7] Protect, manage and restore peatlands to maintain their natural functions, biodiversity and benefits
[8] http://www.gov.scot/Resource/0051/00513102.pdf

Scotland's peatlands are in a degraded condition as a result of historic land management decisions.' To address this, the Plan includes a policy commitment, 'To enhance the contribution of peatland to carbon storage, we will support an increase in the annual rate of peatland restoration, from 10,000 hectares in 2017/18 to 20,000 hectares per year thereafter'. This annual restoration target has allowed the target of '*250,000 hectares restored by 2030*' to be set.

Effects Assessed in Full

6.22 This FEI chapter specifically addresses the outstanding issue regarding peatland from the Over Hill ES raised by consultees (Paragraphs 6.4 to **Error! Reference source not found.**). This assessment therefore considers the following impact

- Direct and indirect loss of blanket Bog and wet modified bog during construction and operation periods.

Effects Scoped Out

Ornithology

6.23 Paragraphs 8.62-8.63 of the Over Hill ES provide details of all the species recorded during baseline surveys that have been scoped out of the original assessment due to the lack, or low numbers of "at-risk" flights or breeding activity recorded during baseline surveys, and lack of habitat suitability within the site. The scoped out species comprise: pink-footed goose, greylag goose, whooper swan, red kite, peregrine, hen harrier, barn owl, waders (except snipe), all passerine species, as per SNH (2014; 2018[9]) guidance, including Schedule 1-listed common crossbill, due to minimal loss of conifer habitat.

6.24 Due to the removal of one turbine, re-siting of turbine 7 by 680m and lesser movements of a further three turbines, it is possible that the modelled collision rate values presented in Appendix 8.1 Annex E of the Over Hill ES may have changed. However, for the above scoped-out species, flight activity rates were very low throughout the baseline period, and so estimated collision rates are still likely to be negligible (or zero) despite layout changes, and the species therefore remain scoped out of the assessment.

6.25 For species that were scoped in to the Over Hill ES, revised collision rates are likely to be very similar to those originally predicted, i.e. zero, or Negligible and therefore Not Significant within the context of their relevant reference populations (either at a Natural Heritage Zone level for breeding species, or a national level for species found in the non-breeding season). The removal of one turbine and movement of turbine 7 to an area of forestry would likely, on balance, slightly reduce collision rates for snipe (which utilises open habitats). Although goshawk is a woodland species, no activity was recorded during any survey type in the area around where turbine 7 would be relocated.

6.26 Therefore, the following species scoped in to the original assessment are scoped out of this FEI due to no changes in the level of impact predicted:

[9] SNH (2018). Assessing Significance of Impacts from Onshore Wind Farms Outwith Designated Areas. Guidance, Version 2 – February 2018.

- Black grouse: The removal of turbine 4, re-siting of turbine 7 (and associated track) and lesser movements of 3 further turbines are likely to reduce impacts on black grouse by a minor degree by avoiding areas where foraging flights were observed.
- Goshawk: The removal of turbine 4, re-siting of turbine 7(and associated track) and lesser movements of 3 turbines will not change the assessment of impact on Goshawk. No flights were observed in the vicinity of turbine 7.
- Snipe: The removal of turbine 4, re-siting of turbine 7 (and associated track) and lesser movements of 3 turbines will reduce impacts on Snipe to a minor degree by avoiding activity close to one mapped territory.

Ecology

6.27 Paragraphs 9.128 to 9.141 of the Over Hill ES provide details of the ecological features that have been scoped out of the original assessment. The scoped out features comprise: Dalmellington Moss SSSI, coniferous plantation, unimproved neutral grassland, acid neutral flush, broad-leaved semi-natural woodland, marsh/marshy grassland, badger otter, water vole, red squirrels, roosting bats, common lizards standing water, running water and fisheries. These features remain scoped out of this FEI due to either similar or lower levels of impact as a result of the revised layout.

6.28 In addition to the above, bats which were scoped in to the original assessment are scoped out of this FEI due to no changes in the level of impact predicted:

- Bats (Collision): The removal of turbine 4, re-siting of turbine 7 and lesser movements of 3 turbines are likely to reduce impacts on bats by a minor degree by reducing total turbine numbers from 11 to 10. The Over Hill ES mentions that high activity (>1Bat Pass Per Night (BPPN)) was recorded at 4 out of 6 static Anabat recording points during the months June-July. The point closest to the re-sited turbine 7, and in similar habitat, is location 4. This point recorded 2.5 BPPN of *Nyctalus* (high risk species) during this period and provides the best estimate of the likely sensitivity of the new location of turbine 7. The proposed mitigation measures detailed in the Over Hill ES and within the SNH Letter of 31/08/2017 (Appendix 6.2) are relevant to the amended layout and will ensure significant effects are avoided.

6.29 Chapter 9 of the Over Hill ES scoped out fish populations from the assessment of potentially significant effects as, due to the peaty nature of watercourses in the area, the site was considered unlikely to provide suitable spawning habitat. This follows the approach outlined in the Energiekontor UK Ltd Scoping Report (July 2016). No changes to the level of impact on fish populations are predicted. However, mitigation measures advised by consultees in Table 6.1 have been considered in the *Construction & Operational Effects of the Development* section.

Methodology

Field Survey

6.30 It was not necessary to update protected species or habitat surveys to inform this FEI (please see 'Limitations' section below for consideration of data age). Peat depth surveys have

however been updated to ensure that the revised layout has been surveyed according to the relevant guidance (Guidance on Developments on Peatland. Peatland Survey 2017). This updated peat depth information (Figures 4.8 and 4.9) has been used to inform the importance of the peatland habitat within this assessment. The information is also used to inform the updated draft Peat Management Plan, Carbon Calculator and Peat Landslide Hazard Risk Assessment (see Chapter 4 Geology, Hydrology and Hydrogeology).

Consultations

6.31 As detailed in Table 6.1 above, consultations with SNH, RSPB, Fisheries Trusts and East Ayrshire Council occurred between June 2017 and February 2018. With regards to peatland (the focus of this FEI chapter) consultation with SNH is the most relevant and is summarised below:

- 31st August 2017: Response to Over Hill ES.
- 6th September 2017: MacArthur Green letter to SNH responding to various queries in SNH's letter.
- 6th October 2017: SNH email response to MacArthur Green letter on peatland issues.
- 25th October 2017: Meeting with SNH, RSPB, East Ayrshire Council, Energiekontor and MacArthur Green to discuss peatland issues. Minutes issued 3rd November 2017).
- 1st December 2017: Email from Energiekontor to SNH and RSPB consulting on amended design.
- 19th December 2017: Response from SNH to amended design.
- 17th January 2018: Email from Energiekontor to SNH on a further design iteration.
- 7th February 2018: Email from SNH to Energiekontor confirming that 'what is now being proposed would be a significant improvement on the original layout from a peatland perspective'.

Assessment Methodology

6.32 This FEI retains the assessment methodology and significance criteria presented in the Over Hill ES (sections 9.22 to 9.36 of the ecology chapter and 8.16 to 8.32 of the ornithology chapter)

Potential Limitations

6.33 The survey data used to inform the assessment is now 9 months older from when the Over Hill ES was submitted. It is not considered that this causes any significant limitations to this assessment as detailed below:

- An Extended Phase 1 habitat survey was completed in November 2013 and NVC surveys were completed in June 2015 and updated August 2016. At the time of writing this FEI assessment the data is one year and seven months old. From peat survey work in 2018 is possible to confirm there have been no events on site (afforestation, fire, heather beetle etc.) which may have caused a material change in habitats or their condition.

- Protected species surveys (excluding bats) were completed in November 2013 (as part of the Extended Phase 1 survey) and August 2015. At the time of writing this FEI assessment the data is two years and seven months old. The location of protected sites of otter, water vole, red squirrel and pine marten may vary between years due to their dynamic nature. The coverage of two years (2013 and 2015) will help to address the inter-annual variability in distribution of these species. Given the low occurrence of protected species on site (low signs of species no protected features recorded) it is considered unlikely that the abundance of these species will have changed to the extent that it impacts upon the assessment. Nonetheless, to ensure that reasonable measures are adopted to protect these species, the standard approach of pre-construction surveys and a Species Protection Plan will be required as proposed in the Over Hill ES.

- Bat surveys (temporal and static surveys): Surveys were completed in: 2014 (monthly between May – October); 2015 (monthly at height surveys using a blimp between April and October); and, static surveys during September 2016. At the time of writing this FEI assessment the data from the last full year of survey in 2015 is two years and six months old (one year and seven months from 2016 September survey). From the peat survey work in 2018 it is possible to confirm that no habitat changes have occurred on site which may lead to a change in bat activity or distribution within the site. Furthermore, because more than two years of survey have been completed, the inter-annual variation in bat activity is taken into account – therefore providing a sufficiently robust baseline to inform an impact over the life of the project.

- Ornithological surveys within and adjacent to Over Hill wind farm were completed between November 2013 to August 2016 – covering three breeding seasons and two non-breeding seasons. At the time of writing this FEI assessment the data is one year and seven months old. From the peat survey work in 2018 it is possible to confirm that no habitat changes have occurred on site which may lead to a change in bird activity or distribution within the site. Furthermore, because more than two years of survey have been completed, the inter-annual variation in bird activity is taken into account – therefore providing a sufficiently robust baseline to inform an impact over the life of the project.

- Turbine 7 is located out with the 2km viewsheds of the vantage points used for baseline flight activity surveys. Although this means that there is a gap in visual coverage of the proposed turbine layout, this is not likely to affect the overall results and robustness of the collision modelling process, and is therefore not a significant limitation. The existing viewshed coverage of Over Hill wind farm is considered to include a suitable sample of forestry habitat that is representative of the adjacent area where turbine 7 is located (for example, no breeding activity was recorded in either area). As such the recorded mean flight activity rates are likely to be applicable to the Over Hill wind farm as a whole.

Project Assumptions

6.34 Project assumptions and design considerations detailed in paragraph 9.118 to 9.126 of the Over Hill Ecology assessment and 8.59 of the ornithology assessment apply to this FEI.

Baseline

6.35 The baseline as described in paragraphs 9.4 to 9.115 of the Over Hill Ecology assessment and 8.37-8.55 of the ornithology assessment apply to this FEI.

The Do Nothing Scenario

6.36 The do nothing scenario as described in paragraphs 8.57-8.58 of the Over Hill ES ornithology assessment applies to this FEI.

6.37 The do nothing scenario detailed in paragraph 9.117 of the Over Hill ecology remains the same with the exception of blanket bog / modified bog habitat where further detail is provided here to clarify likely future conditions for this habitat. In the absence of the wind farm, and with the continued presence of forestry, it is likely that the bog habitat on site will continue to be degraded through further habitat loss as a result of drying effects, canopy closure and re-seeding of Sitka spruce once the crop reaches 25-30 years old (Forestry Commission, 2015).

6.38 In the absence of Over Hill Wind Farm, a possible future scenario is that the forestry located on deeper peatland within the site may not be replanted (or planted with peat edge woodland) in accordance with current forestry commission guidance (Forestry Commission 2015). This guidance explains that a combination of: predicted General Yield Class (GYC) of the second rotation crop, edaphic (soil) and restoration potential should be used to establish suitable areas for re-stock and restoration.

6.39 The yield class at the site for Sitka spruce (the main species on site) varies widely between 2 and 24 with an average of 10 (see Chapter 13, Forestry of Over Hill ES). The guidance explains that to be considered for re-stocking the crop should be 'clearly SS GYC 8 or above'. From site observations it is clear that central site areas (on deeper peats) fall below GYC 8 however areas on shallower peats away from the core of the peatland area fall above this level.

6.40 The guidance also explains the NVC/Peatland types that are likely to be less suitable for re-planting. These are NVC types M17 and M18 which fall within FCS soil code 10a and 10b and soil group 'Sphagnum or unflushed flat/ raised bogs'. These NVC types are dominant throughout the central and western parts of the site (Figure 9.3). NVC/Peatland types that are more suitable for re-planting are located further to the west and east of the site towards the edges of the Planning Boundary. These fall within FCS soil codes 9a-9e and soil group 'Molinia or flushed blanket bogs'.

6.41 As detailed in Chapter 13 (Forestry) of the Over Hill ES, the UK Forestry Standard recommends restructuring the age class and species of large blocks of even aged, single species forests (such as those at Over Hill). This would yield both forest management and environmental benefits. Whilst some early felling of coupes may occur at Over Hill in accordance with this policy, the crop would not reach felling age until approximately 60 years. This is the period at which the Maximum Mean Annual Volume Increment (MMAI) is reached at yield class 10 (Yield Class 6 = 65 years, Yield Class 24 = 45 years) (Edwards & Christie, 1981).

6.42 The conifer crop at Over Hill is around 23 years old (planting year 1994/95). Therefore, felling of the higher yield class coupes (GYC 14) on site may occur by 2049 and the lower yield class areas (GYC 6) by 2060. As detailed above, the lower yield class areas cover the parts of the site which are likely to be suitable for restoration (they have appropriate edaphic and habitat characteristics). As detailed in Chapter 3, Project Description Over Hill Wind Farm will be operational by around 2022 and will operate for 25 years. This means that whilst areas of high yield class crops may be felled by year 28 of the operational period, the crop on wetter areas suitable for restoration would not be felled until after wind farm decommissioning (2052). Wind blow risk of older crops in higher altitude locations may mean that felling occurs before MMAI is reached, however, even if felling is brought forward by 10 years the crop in deeper peat areas would be felled at towards the end of the wind farm operational period or after wind farm decommissioning.

6.43 Given the above consideration, the relevant baseline for the site with regards to forestry remains as detailed in Chapter 13 Paragraph 13.53 of the Over Hill ES 'There are no baseline felling or restocking plan due to the age and growth rates of the crops. The changes to the forest structure resulting from the Proposed Development are compared against the baseline current species'.

Description and Evaluation of Effects

6.44 The updated assessment of effects on blanket bog and wet modified bog is presented here. The same assessment methodology as adopted within the Over Hill ES is used here (paragraphs 9.22-9.35).

6.45 Table 6.4 provides the updated direct and indirect habitat loss calculations for the revised FEI layout.

Table 6.4: Direct and Indirect Loss of Habitats

Phase 1 Habitat Description	Area (hectares)	Direct Loss (Ha)	Direct & Indirect Loss (Ha)
Broad-leaved Semi-natural Woodland	6.8	0.0	0.1
Broad-Leaved Plantation Woodland	1.6	0.0	0.1
Coniferous Plantation Woodland	275.0	5.4	16.1
Unimproved Acid Grassland	4.5	0.0	0.2
Unimproved Neutral Grassland	9.1	0.0	0.1
Marsh/Marshy Grassland	65.2	1.2	3.3
Tall Ruderal	0.0	0.0	0.0
Blanket Bog	**238.8**	**2.7**	**9.5**
Wet Modified Bog	**40.7**	**0.3**	**1.4**
Acid Neutral Flush	6.9	0.1	0.3
Swamp	0.0	0.0	0.0
Bare Ground	2.7	0.4	1.2
Area Not Surveyed within Planning Boundary	18.2	0.4	1.8
Total Area (Ha)	**669.5**	**10.6**	**34.1**

Construction & Operational Effects of the Development

6.46 **Impact**: Potential impacts remain the same as detailed within the Over Hill ES (Chapter 9, Paragraph 9.147-9.148). For ease of reference, these are repeated below.

6.47 Impacts upon wet modified bog and blanket bog habitats during construction would be direct (through habitat loss (occurring during construction of the wind farm)) and indirect (through potential drying effects upon neighbouring bog habitats (occurring during the operational period)). Direct loss would occur in areas where access tracks pass through this habitat type or where infrastructure such as turbine foundations, crane pads, hardstandings, compounds etc. are sited on these habitat types. In addition, there may be indirect losses as a result of drainage around infrastructure and disruption to hydrological flows.

Nature Conservation Importance:

6.48 Due to its extent and quality, and as one of the best examples of this type of habitat within the wider area, this feature has been considered as of **Regional** Nature Conservation Value.

6.49 In their consultation response (31 August 2017), SNH propose that the blanket bog on site is a 'nationally important resource'. The assessment methodology detailed within Chapter 9 of the Over Hill ES refers to National Nature Conservation Value being determined by whether the blanket bog would meet the criteria for qualification as a SSSI[10]. It is recognised that the blanket bog at Over Hill meets a number of the criteria within the guidance, however, it is considered that it would not fully meet the selection criteria due to the presence of extensive commercial forestry within the blanket bog's hydrological unit, adversely affecting its naturalness and quality (as detailed in the JNCC guidance for selection of SSSIs, it is important that a boundary of a SSSI includes the full hydrological unit (macrotope).

6.50 As detailed in the consideration of peatland policy above, Class 1'carbon rich soils and priority peatland' is present at Over Hill and this is defined as a 'Nationally Important resource' for these attributes (carbon storage and priority peatland habitat). It is recognised that this definition is not purely for nature conservation and so not directly applicable to evaluating purely the nature conservation importance of a peatland.

6.51 **Conservation Status**: Conservation Status of this habitat as assessed in the JNCC report on blanket bog[11] is 'Bad and Declining' at the UK level. However, the Conservation Status of the bog within the site is considered to be favourable but declining as a result of the impact.

6.52 **Magnitude**: The UK has an estimated 2,210,000 ha of blanket bog of which 1,759,000 ha is in Scotland and 31,329 ha within Ayrshire[12] (9.28 % of Ayrshire's total land cover) (i.e. the council area in which the Proposed Development lies).

6.53 As per Table 6.4 above, the total amount of direct habitat loss is predicted to be 2.7ha of blanket bog (reduced from 3.95 ha in Over Hill ES) and 0.3ha for wet modified bog

[10] http://jncc.defra.gov.uk/pdf/SSSIs_Chapter08.pdf

[11] JNCC (2013: Thirds report by the United Kingdom under Article 17, Habitat H7130 – Blanket bogs, (http://jncc.defra.gov.uk/pdf/Article17Consult_20131010/H7130_UK.pdf).

[12] Ayrshire Local Biodiversity Action Plan at http://www.ayrshire-jsu.gov.uk/albap_reports.html

(increased from 0.07 ha in Over Hill ES). The direct and indirect loss of blanket and wet modified bog (assuming a 10m indirect drying effect as assumed in the carbon calculator) is 9.5 ha of blanket bog (reduced from 12.37 ha in the Over Hill ES) and 1.4 ha of wet modified bog (increased from 0.27 ha in the Over Hill ES). In total, this represents a loss of 3.9 % of the overall total extent of blanket bog and wet modified bog within the study area (down from 6% in the Over Hill ES).

6.54 Blanket bog on site is a good example of this type of habitat within the region and within the wider area mainly lower quality blanket bog is present. The blanket bog macrotope is well connected over a large area and retains a good condition in open areas despite the planting of conifers. The M18 community present remains in a good and actively peat forming condition. When considering the above direct and indirect habitat losses of 11.0 ha (equivalent to loss of 0.035 % of blanket bog in Ayrshire) and the good quality of the blanket bog within the Proposed Development Area, an effect magnitude of **Low spatial** and **Long Term temporal** reached**.**

6.55 **Significance**: Given the above consideration of Nature Conservation Importance, Conservation Status and Magnitude, the effect significance is considered to be **Moderate Adverse** and **Significant** under the terms of the EIA Regulations

Proposed Mitigation

6.56 An Outline Habitat Management and Research Plan (OHMRP) is proposed to compensate for the adverse effect on blanket and modified bog habitat. This will involve the removal of areas of commercial forestry and restoration to blanket bog and modified bog (compensation ratio of 1:8 including indirect effects). It will also include proposals for a detailed research project to assess the impact of wind farm infrastructure on peatland. This will involve a Before and After Control Impact (BACI) design to assess changes to the water table and consequent changes to the vegetation after the development is constructed. This research would be developed with SNH and SEPA and would help to inform future assumptions within the carbon calculator and assess the efficacy of certain construction techniques at reducing impacts on peatland.

6.57 Various construction mitigation measures are already outlined in the ES that would provide mitigation for fish populations within the upper Black Water catchment. For example, a Construction and Environmental Management Plan (CEMP) would be prepared defining the methodologies and management measures to be employed in the construction of the Proposed Development. The CEMP would include amongst other information, details of the access points and routes to be utilised to reach each work location, pollution prevention control measures, particularly in relation to watercourses but also control of airborne pollution and dust and the location of construction work areas. An Environmental Clerk of Works (ECoW) would also be appointed to ensure that all ecological mitigation measures were adhered to during construction. In addition, all turbine bases and borrow pit locations have been located in excess of 50m from watercourses.

6.58 In addition to these measures, it is proposed that monitoring be carried out specifically in relation to fish populations. This would be in the form of pre-, during and post-construction monitoring surveys to identify whether there has been any impact on fish populations or habitats. The main method of determining fish populations would be by the use of

electrofishing surveys. This involves the stunning of fish using an electric current, which enables the surveyor to remove the fish from the water. Once captured, the fish recover in a holding container before being anaesthetised using a specific fish anaesthetic, identified, measured and recorded. Once recovered, the fish are returned unharmed to the area from which they were captured.

6.59 The surveys would be carried out at locations to be agreed with SNH and the Ayrshire Rivers Trust as part of a post-consent planning condition. Post-construction surveys would be completed during the first year of operation.

6.60 No further mitigation is required in addition to the above and assumed and in-built mitigation described elsewhere in this Chapter (e.g. mitigation by design, implementation of a SPP, presence of an ECoW etc.) and standard environmental practices to be employed and documented within the chapters of this FEI documents.

Residual Construction and Operational Effects

6.61 Whilst the development of the wind farm at Over Hill has an adverse impact on the blanket bog habitat it also creates the opportunity to reverse the damaging effects that commercial forestry plantation will continue to exert on the bog at Over Hill over the coming 40 years. The extensive restoration proposals in the habitat management plan will help to ensure this opportunity is taken advantage of. Taking this into account, construction and operational effects on blanket bog will be reduced to **Negligible/Positive** and will therefore be **Not Significant** in the context of the EIA Regulations.

Decommissioning Effects of the Development

6.62 Decommissioning of the Development is unlikely to lead to any further loss or damage to the blanket bog or modified bog within the site. In advance of decommissioning, a plan should be developed in consultation with SNH and East Ayrshire Council detailing the most appropriate techniques for decommissioning the site so that impacts on important peatland habitats are avoided. It is not possible to detail these techniques at present as good practice is likely to change over the next 25 years.

Cumulative Effects

6.63 The mitigation measures detailed on the OHMRP will deliver a compensation ratio of 1:8 for blanket bog and modified bog through the removal of commercial forestry and restoration of bog. This will ensure that Over Hill wind farm does not contribute to cumulative effects.

SUMMARY

6.64 A summary of the FEI assessment on blanket bog and wet modified bog is provided below.

Table 6.5 Significance Criteria

Impact	Significance	Mitigation	Significance of Residual Effect
Construction & Operation			
Direct and Indirect Impact Modified Bog and Blanket Bog	Moderate (Significant)	A pollution prevention measures and best practice construction methods will be agreed with stakeholders prior to construction. An ECoW will oversee construction process. Prescriptions within OHMRP. Habitat management prescriptions to include removal of plantation forest, restoration of bog habitats, removal of conifer regrowth and drainage blocking as well as long-term monitoring and habitat management over the operational phase. A detailed research project to assess the impact of wind farm infrastructure on peatland will be undertaken.	Negligible/Positive (Not significant)

References

- Deciding future management options for afforested deep peatland. Forestry Commission 2015
- Edwards P.N., Christie J.M. (1981) Yield Models for Forestry Management. Forestry Commission Booklet 48.
- Forestry Commission (2015) Managing invasive and non-native forestry species. Guidance for Forest Owners and Managers.

Over Hill

FURTHER ENVIRONMENTAL INFORMATION

CHAPTER 7: NOISE ASSESSMENT

March 2018

7 Noise Assessment

Introduction

7.1 Chapter 10 of the Environmental Statement (ES) and the associated Noise and Vibration Technical Report, included as Appendix 10.1, provided an assessment of the noise and vibration effects arising from the Proposed Development on nearby noise sensitive receptors.

7.2 The present chapter considers the implications for noise of the proposed amendments to the Proposed Development described in Chapter 2 of the present SEI. This chapter also considers the consultation responses received.

7.3 In terms of amendments, the Proposed Development for which the Developer is seeking consent has been modified to remove Turbine 4 and change the location of some of the turbines. The revised turbine coordinates are set out in Table 1 of Chapter 2 of the present FEI. A different on-site track route is also proposed, including a new branch which accesses turbines 7, 10 and 11.

Consultation Responses

7.4 ACCON UK reviewed the noise assessment presented in Chapter 10 of the ES and associated appendices on behalf of East Ayrshire Council. The results of this review were set out in a report by ACCON UK dated 21 July 2017. The main conclusions of that report were that:

7.5 *"ACCON has reviewed the application with regards to noise impacts and have determined that the assessment methodologies and the conclusions are appropriate. ACCON have not identified any over-riding reason for refusal in respect of noise."*

7.6 *The* report noted that "*[t]he methodologies used in the noise chapter and noise technical appendix represent good practice and are in line with the IOA Good Practice Guidance for wind turbines.*"

7.7 With regards to the operational noise limits proposed by the Developer, ACCON UK did not have adverse comments but considered that they should be reviewed "*to take account of the recent planning consent for South Kyle wind farm*". This is understood to be in relation to a clause in the initially proposed conditions which resulted in different limits if the South Kyle development had not been consented. It is therefore proposed to omit this clause in the limits and that this would address the point raised by ACCON. These revised limits are set out in Tables 7.5 and 7.6 below.

7.8 An objection letter dated August 2017 from the resident at Upper Beoch Farm discusses different aspects including the noise impact assessment presented in the ES. It raises concerns regarding the methodology applied in the ES for consideration of cumulative impacts of the Proposed Development with mining operations in the area. This was reviewed independently by ACCON UK which concluded that:

7.9 *"Operational wind farm noise from the Proposed Development and open cast mining activities have not been considered cumulatively due to the significant differences in noise characteristics of these activities. […] ACCON confirm that this approach is appropriate, as we agree that the two types of noise are very different in character. However, we acknowledge that should the development go ahead, for some of the time there will be overall increases in ambient noise during both day-time and night-time, although these will be highly dependent on the wind conditions prevailing at the time."*

Construction Noise and Vibration

7.10 Noise predictions were included in the original ES for the construction phase of the Proposed Development. These predictions related to the worst-case periods of the different phases of the decommissioning and construction periods, as determined from the minimum separation distances between the different necessary activities and the assessment locations surrounding the site.

7.11 The amendments to the Proposed Development mean that the amount of construction activities will generally be similar or reduced compared to that assessed previously; however, in some cases, the minimum separation distances with some of the activities will be reduced. This relates primarily to the new section of site track which accesses turbines 7, 10 and 11: this will pass closer to the Upper Beoch location than the previously proposed tracks, with a minimum distance of approximately 350 m at the closest point of the track.

7.12 Table 7.1 below provides a revision of Table 3 of Appendix 10.1 of the ES, and sets out revised predicted worst-case noise levels for key construction activities during the Development, *when* the activity is closest to the referenced property. This is based on the same methodology previously described in Appendix 10.1. Predictions for other construction activities not shown in Table 7.1 remain unchanged compared to these previously shown in Appendix 10.1 of the ES: these did not exceed 55 dB L_{Aeq}.

Table 7.1: Revised Predicted Construction Noise Levels

Task Name	Plant/Equipment	Upper Collective Sound Power, dB(A)	Nearest Receiver	Minimum Distance to Nearest Receiver	Predicted Upper Day-Time level, dB L_{Aeq}
Construct site tracks	excavators / dump trucks / tippers / dozers / vibrating rollers	120	Upper Beoch	350	59
Excavate and lay site cables	excavators / dump trucks / tractors & cable drum trailers / wacker plates	110	Upper Beoch	350	49

Lay cable to sub-stations	JCB / saws / hydraulic breaker / dump truck/ tipper / wacker plate / tandem roller / tractor & cable drum trailer / delivery truck	115	Upper Beoch	350	54
Forestry felling around turbines and access tracks	Harvesters and forwarders, characterised by saw noise diesel engine noise emissions commonly associated with tractors and excavation noise	115	Upper Beoch	350	54

7.13 The predicted levels generally do not exceed 54 dB L_{Aeq}, except for the works associated *with* the construction of the site access track for which worst-case levels of 59 dB L_{Aeq} are predicted. It should be noted that the predicted noise levels are likely to represent those for a relatively short-term period when activity is closest to the receptor. Noise levels will quickly diminish as the site track construction progresses, moving the activity further from the property. With reference to the criteria of Table 10.2 in Chapter 10 of the ES, this predicted noise level corresponds to a slight effect, which is not considered significant.

7.14 In addition to on-site activities, construction traffic passing to and from the site will also represent a potential source of noise to surrounding properties. This was assessed previously in Chapter 10 of the ES. The updated traffic assessment presented in Chapter 11 of the present SEI presents revised predicted construction traffic values. The revised predicted wort-case traffic monthly traffic values, on which the assessment of Chapter 10 of the ES was based, are the same as previously described in Chapter 11 the ES. Therefore, most of the conclusions in the ES in relation to noise from construction traffic remain applicable.

7.15 One additional source of potential noise effect which requires assessment in the present chapter is construction traffic using the new proposed section of site track which accesses turbines 7, 10 and 11. This assessment is based on the conservative assumption that the predicted worst-case construction traffic flows all pass through the new section of site track at some stage of the construction.

7.16 Large heavy goods vehicles can generate noise levels in the order of 108 dB (sound power level) when in motion. However, these types of plant usually pass a receiver location quite quickly. When stationary the same vehicles will be operating in idle which considerably lowers the noise output to the environment. Based on the prediction methodology in BS 5288 and accounting for heavy goods vehicles moving at an estimated 15 miles per hour, the predicted noise level at Upper Beoch is of no more than 45 dB $L_{Aeq,T}$. With reference to the criteria previously referenced above, this represents a negligible impact.

7.17 As discussed in the ES, construction activities may coincide with the day-time hours of operation of opencast mines in the area which are typically conditioned to operate during

the day-time to a noise limit of 55 dB $L_{Aeq, 1hr}$ for normal operation. As a worst case, if it is assumed that a nearby mine was operating on its normal operating noise limit of 55 dB L_{Aeq} at a time when the noisiest construction activity was taking place at the Proposed Development, at a level of 59 dB L_{Aeq}, the resultant level would be of 60.5 dB L_{Aeq}. As coincidence of greatest noise levels would have to occur at the nearest property to the Proposed Development, Upper Beoch, to marginally exceed a level of 60 dB, it is considered highly unlikely that this would occur regularly, if at all. Taking into account the short duration of these potential cumulative noise impacts, their effect would remain of slight significance, and therefore not significant.

7.18 In conclusion, noise from construction activities has been assessed for the amended development and are still predicted to result in temporary negligible to slight effects, which *are* not significant. This included the consideration of potential cumulative noise effects from mining operations in the area. The proposed mitigation measures, including restrictions to working hours, would remain applicable and could be secured through planning conditions to the consent.

Operational Noise

7.15 The proposed revisions to the turbine layout include removal of Turbine 4, but also some changes to some of the turbine locations which result in turbines moving marginally closer to the nearest neighbouring residential locations. The effect of these changes was assessed by updating the previously developed noise model of the proposed turbines. The prediction methodology, assumed candidate turbine model and noise emission levels remain unchanged compared to those previously used and described in Chapter 10 and Appendix 10.1.

7.16 Table 7.2 presents the resulting updated predictions of operational noise for the Proposed Development based on the revised turbine layout. By comparison with Table 8 in Appendix 10.1 of the ES, the amendments result in an increase of 0.1 dB in the predicted noise levels at the nearest residential property previously considered in Chapter 10 of the ES, Upper Beoch. This level of change would generally be considered negligible. These predicted noise levels also remain below the simplified assessment criteria of 35dB L_{A90} defined in ETSU-R-97.

Table 7.2: Revised Predicted L_{A90} (dB) Wind Farm Noise Levels for the Proposed Development at Each of the Noise Assessment Locations

Property	Standardised wind speed at 10 m height (m/s)								
	4	5	6	7	8	9	10	11	12
Upper Beoch	27.2	30.9	33.5	33.6	33.6	33.6	33.6	33.6	33.6
Nith Lodge	19.3	23.0	25.6	25.7	25.7	25.7	25.7	25.7	25.7
Maneight	23.5	27.2	29.8	29.9	29.9	29.9	29.9	29.9	29.9
Craighouse	20.2	23.9	26.5	26.6	26.6	26.6	26.6	26.6	26.6

7.17 Predicted noise levels from the Polquhairn Wind Farm remain comparatively negligible in relation to these predictions and therefore this needs not be considered further. Table 7.3 below sets out revised cumulative noise levels predictions for the Proposed Development

with Enoch Hill Wind Farm and South Kyle Wind Farm, based on the methodology set out in the ES. Table 7.4 then presents a comparison of the predicted cumulative noise levels of Table 7.3 with the relevant cumulative noise limit previously derived and set out in Table 2 of Appendix 10.1 of the ES.

Table 7.3: Predicted cumulative L_{A90} (dB) Wind Farm Noise Levels at Each of the Noise Assessment Locations

Property	Standardised wind speed at 10 m height (m/s)								
	4	5	6	7	8	9	10	11	12
Upper Beoch	28.6	32.2	35.2	35.9	36.1	36.0	36.0	36.0	36.0
Nith Lodge	26.3	29.9	33.6	35.0	35.4	35.3	35.2	35.2	35.2
Maneight	27.6	31.2	34.9	36.2	36.6	36.5	36.5	36.5	36.5
Craighouse	25.0	28.6	32.3	33.6	34.0	34.0	33.9	33.9	33.9

Table 7.4: Difference between the Cumulative ETSU-R-97 Noise Limits and the downwind Cumulative Predicted $L_{A90,T}$ Wind Farm Noise Immission Levels (Table 7.3) at Each Noise Assessment Location. Negative values indicate the noise immission level is below the limit.

Property	Standardised wind speed at 10 m height (m/s)								
	4	5	6	7	8	9	10	11	12
Upper Beoch	-6.4	-2.8	0.2	0.9	1.1	1.0	1.0	1.0	1.0
Nith Lodge	-13.7	-10.1	-6.4	-5.0	-4.6	-4.7	-6.4	-6.4	-6.4
Maneight	-12.4	-8.8	-5.1	-3.8	-3.4	-3.5	-5.1	-5.1	-5.1
Craighouse	-15.0	-11.4	-7.7	-6.4	-6.0	-6.1	-6.1	-6.1	-6.1

7.18 This shows, as previously, that the predicted cumulative wind farm noise immission levels comply with the relevant ETSU-R-97 noise criterion in all cases, except at Upper Beoch under some wind speeds. However, this assumes simultaneous downwind propagation.

7.19 Further calculations have been carried out at Upper Beoch using the more detailed directional methods previously discussed in the ES. Figures 7.1 below illustrates the results of a directional calculation and provides the overall noise level at the wind speed where wind turbine noise is predicted to be at its greatest above the limit, 8 m/s. This Figure includes the contribution from each of the wind farms and the cumulative total for the complete range of wind directions at Upper Beoch, and represents an update to the similar analysis previously presented in the ES Appendix 10.1. It can be seen from Figure 7.1 that the simplified 35dB L_{A90} noise limit is exceeded for only a very small range of wind directions, covering approximately 30° to 80°. Figure 7.2 illustrates the results of a revised directional analysis at 8 m/s with T9 and T10 switched off. This demonstrates that the Proposed Development would comply with the simplified limit under the wind directions of 30 to 80 degrees by switching off turbines T9 and T10. It is likely that a similar outcome could be achieved through use of reduced noise operation which is available on most modern turbine models.

7.19 It is therefore concluded that predicted cumulative noise immission levels from the Proposed Development when operating with the Enoch Hill Wind Farm and South Kyle Wind Farm, should both these sites be consented, can remain compliant with the relevant ETSU-R-97 criteria at all locations and all wind speeds. This outcome has been achieved through use of turbine curtailment applied to T9 and T10 of the turbines of the Proposed Development in a limited range of conditions.

7.20 This can be secured in practice using a standard planning condition for operational noise, *based* on the noise limits set out in Tables 7.5 and 7.6, which were included in the previous noise condition suggested by the Developer and reviewed by ACCON UK on behalf of East Ayrshire Council. Satisfactory control of cumulative noise levels would then be achieved through enforcement of the individual consent limits for each of the wind farms.

Mitigation and enhancement

7.21 The mitigation and enhancement measures remain as suggested in Chapter 10 of the ES.

Residual Impacts

7.22 This remains as stated in Chapter 10 of the ES.

Summary

7.23 Following consideration of the consultation responses and the amendments to the Proposed Development, an updated analysis has determined that the effects of construction and operational noise from the Proposed Development on the residents of nearby dwellings remained similar to those set out previously in Chapter 10.

7.24 In summary, the overall levels of construction noise are considered to represent a temporary negligible or slight effect, and are therefore considered not significant in EIA terms.

7.25 At some locations under some wind conditions and for a certain proportion of the time, noise from the operational wind farm may be audible; however, operational noise levels are acceptable in line with guidance commended by planning policy for the assessment of wind farm noise, and are therefore considered not significant in EIA terms. Noise limits have *been* determined in consultation with East Ayrshire Council to secure this in practice through planning conditions.

Figure 7.1: Chart of the predicted wind turbine immission noise levels at Upper Beoch per wind direction showing the contribution from each nearby wind farm and the cumulative total. All turbines unconstrained.

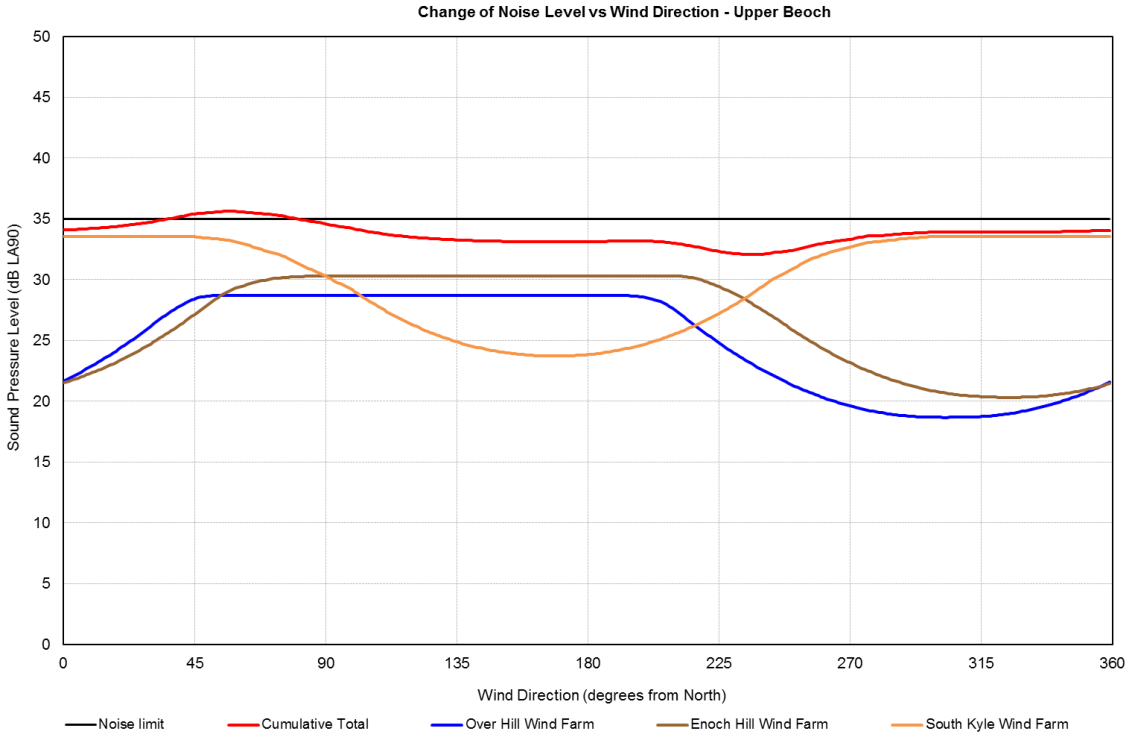

Figure 7.2: Chart of the predicted wind turbine immission noise levels at Upper Beoch per wind direction showing the contribution from each nearby wind farm and the cumulative total. Development turbines T9 and T10 switched off.

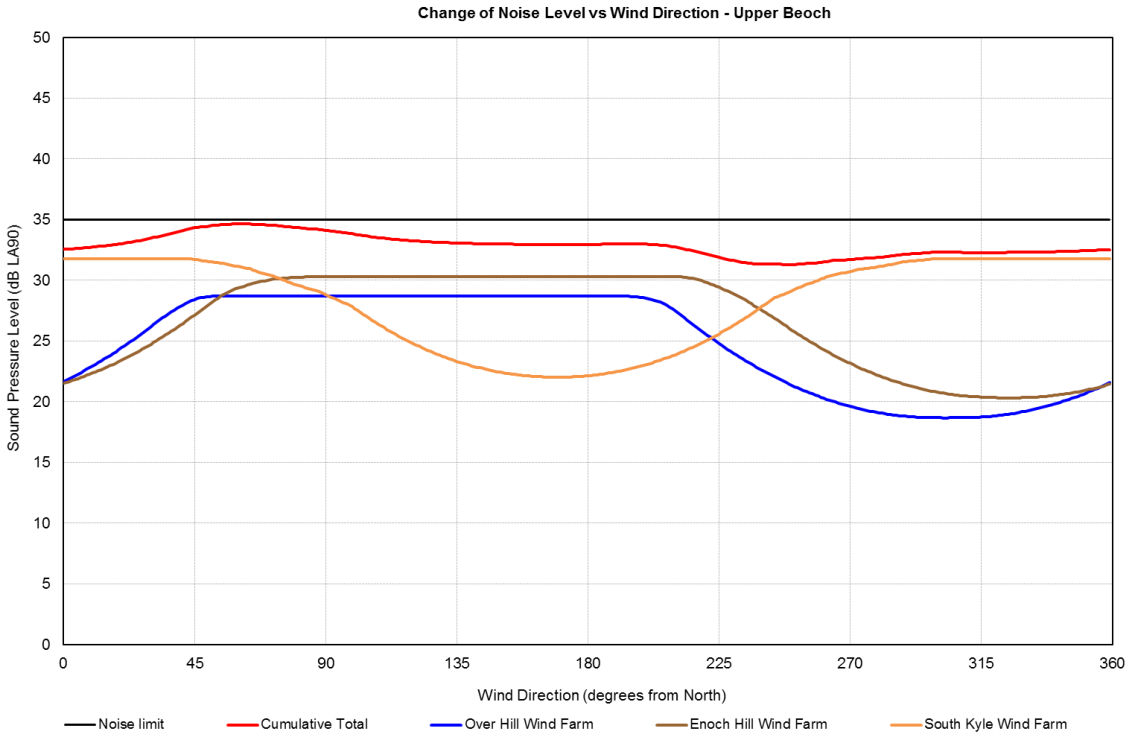

Table 7.5: Noise limits for the Development expressed in dB $L_{A90,10\ minute}$: for wind directions not between 30 and 80 degrees from north.

Property	Standardised wind speed at 10 m height (m/s)								
	4	5	6	7	8	9	10	11	12
Upper Beoch	35	35	35	35	35	35	35	n/a	n/a
Nith Lodge	32	32	32	32	32	32	32	n/a	n/a
Maneight	32	32	32	32	32	32	32	n/a	n/a
Craighouse	32	32	32	32	32	32	32	n/a	n/a

Table 7.6: Noise limits for the Development expressed in dB $L_{A90,10\ minute}$: for wind directions between 30 and 80 degrees from north.

Property	Standardised wind speed at 10 m height (m/s)								
	4	5	6	7	8	9	10	11	12
Upper Beoch	32	32	32	32	32	32	32	n/a	n/a
Nith Lodge	32	32	32	32	32	32	32	n/a	n/a
Maneight	32	32	32	32	32	32	32	n/a	n/a
Craighouse	32	32	32	32	32	32	32	n/a	n/a

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FURTHER ENVIRONMENTAL INFORMATION
CHAPTER 8: ARCHAEOLOGY ASSESSMENT

March 2018

8 Archaeology Assessment

Introduction

8.1 This chapter of the FEI provides an assessment of the effects on archaeological matters (direct effects and effects on setting) resulting from the proposed revised wind farm layout. The assessment has been undertaken by CFA Archaeology Ltd (CFA); the authors of Chapter 7: Cultural Heritage and Archaeology of the original ES. Although submitted under the Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017, this does not materially alter the assessment provided previously in Chapter 7: Cultural Heritage and Archaeology of the original ES, which was carried out under the previous Regulations. Therefore, where appropriate, cross-reference is made to Chapter 7 of the original ES and this FFEI should be read in conjunction with that chapter.

8.2 Details of the revisions to the proposed development, and the reasons for those changes, are set out in Chapter 2: Wind Farm Design Development of this FEI. In essence, the proposed changes are: the deletion of T4 and the re-location of turbines T6, T7, T10 and T11; and commensurate changes to the on-site track layout. The revised layout is shown on Figure 8.1 of this FEI, along with the locations of cultural heritage assets within the Proposed Development Area.

8.3 The proposed deletion of turbine T4 and the relocation of turbines T6, T7, T10 and T11 results in some minor changes to the blade tip height Zone of theoretical visibility model (ZTV). These changes are addressed in Chapter 10: Landscape and Visual Assessment (see Figure 10.10 for a comparative ZTV); the notable change for cultural heritage matters being the reduction, by one turbine, of the predicted visibility from some heritage assets in the wider study area.

Application Consultation Responses

8.4 Table 8.1 provides details of application consultation responses that have been received in relation to cultural heritage and archaeology and, where necessary, how the issues raised have been addressed in this FEI.

Table 8.1: Application Consultation Responses

Consultee	Consultee Comment	Response / Action Taken
Environment Scotland (HES) ES consultation (26/06/2017)	Content that there will not be significant impacts on heritage assets covered by HES remit.	No action required relative to proposed revised layout.
	Welcomed the inclusion of an assessment of impacts on heritage assets up to 10 km from the development, and consider the scope of assessment appropriate in this instance. Broadly content that the methodology used is appropriate, and welcome the detailed	No action required relative to proposed revised layout.

	reference made to the recently updated Managing Change guidance note on 'Setting'.	
	The inclusion of visualisations was helpful. In particular HES found Figure 7.9 useful in confirming that there will not be a significant impact on the category A listed temple at Dumfries House, or the associated inventory designed landscape.	ion required relative to proposed revised layout.
West of Scotland Archaeology Service (WoSAS) ES consultation (22/06/2017)	Confirmed that WoSAS are generally content with the methodology adopted to assess the potential effect of construction of the wind farm on the historic environment.	No action required relative to proposed revised layout.
	Accepted the conclusions of the assessment, which are that while the turbines of the proposed wind farm would be visible from a number of significant monuments that are present in the surrounding landscape, the degree of change from the existing baseline conditions is unlikely to be of a sufficient magnitude as to suggest that planning consent should be refused on this basis.	No action required relative to proposed revised layout.
	Assuming that it would be feasible to construct the various access tracks using the floating road methodology, WoSAS agreed with the statement made in paragraph 7.62 of the ES that the prospects of encountering sub-surface archaeological material may be restricted to the turbine positions and their associated crane stances themselves. Recommended that a condition be applied to any consent and provided wording for a suitable condition.	The positions of four turbines have been varied and the associated track layout has been amended to address matters raised by other consultees. Therefore, additional consultation was carried out and an assessment of the changes is presented in this chapter of the FEI.
(06/03/2018) response to enquiry by CFA (email)	There will be a direct impact on the former ironstone mine (Asset 8), but this is likely to be at a level that could be addressed by mitigation measures (watching brief)	Mitigation is considered in this chapter of the FEI.

Scope of the FEI Chapter

8.5 As the statutory consultees have confirmed that they are satisfied with the approach to the assessment presented in the original ES, the findings and the mitigation proposed,

the content of this FEI is restricted to an assessment of the effects of the proposed changes on archaeology and cultural heritage and should be read in conjunction with the original ES.

8.6 The Development footprint has been modified as a consequence of the removal of one turbine (T4) and the relocation of four others (T6, T7, T10 and T11), but the Application Site boundary remains unaltered. As a consequence of the relocation of turbines, the turbine envelope has been extended slightly, which has a commensurate effect on the extent of the wider study area. However, that extension does not make a material difference to the assessment of the effects on the setting of heritage assets therefore the study areas employed in the ES have been retained for the assessment presented in this FEI.

8.7 No additional research has been required for this assessment. The assessment below draws on the baseline data gathered during preparation of Chapter 7 of the original ES. That data was acquired from the Council's HER and augmented by the results of field survey carried out in March 2017.

8.8 The revised layout results in minor changes to the ZTV but these do not result in a material change either to the magnitude of the predicted impacts on the settings of heritage assets in the wider study area or to the resultant significance of the predicted effects. Therefore, detailed reassessment of operational impacts, as these affect the settings of designated heritage assets in the wider study area, including cumulative impacts, is scoped out of the FEI.

8.9 Unless otherwise stated, the effects of the revised layout on cultural heritage remains as reported in Chapter 7 of the original ES.

Assessment Methodology

8.10 The methodology employed in the assessment carried out in Chapter 7 of the original ES was found to be acceptable by both HES and WoSAS in their responses to the original ES (Table 8.1). Therefore, the same approach has been adopted for this chapter of FEI, which should therefore be read in conjunction with Chapter 7 of the original ES.

Existing Conditions

8.11 The baseline condition of cultural heritage assets within the Proposed Development Area, recorded through desk-based assessment and field survey in 2017, and described in Chapter 7 in the original ES, have not changed since that time. The baseline character as set out in paragraphs 7.37 – 7.54 of the original ES therefore remains valid for this FEI.

Revised Assessment of Effects

8.12 The assessment of effects is based on the amended layout as described in Chapter 3: Project Description of this FEI. Unless otherwise stated, potential effects identified are considered to be adverse.

8.13 As mentioned above, only those heritage assets that are considered to be affected by the amendments to the Proposed Development are re-assessed within this chapter. Conclusions are drawn as to whether the significance of any effect has changed as a result of the amendments to the Proposed Development. The other effects on cultural heritage, as reported in Chapter 7 of the original ES, remain unchanged.

Construction Effects

Predicted Construction Effects

8.14 The revision to the Proposed Development layout has resulted in one new predicted direct effect (Figure 8.1): the track to turbines T7, T10 and T11, along the eastern side of the Proposed Development Area, passes through an area of historic ironstone mining (Asset 8).

8.15 Green Knowe: Ironstone Mine (Asset 8) is shown on the Ordnance Survey 1st Edition map (1860), and the HER entry (WOSASPIN 61157) records that the workings include an adit, quarries and a square (roofed) building. The remains of quarry working and spoil heaps are visible on modern aerial photography in an open area within the forestry plantation along the northern side of an unnamed watercourse. The mining remains are an asset of local heritage importance, part of a local landscape of similar 19th century mining activity, and are assessed as being of low sensitivity.

8.16 The access track would cross the remains of the as shown below (Figure 8.2).

Figure 8.2: Green Knowe Ironstone Mine, indicating proposed crossing point (approximate alignment)

8.17 The access track would have a running surface of approximately 4.5 m, with local widening at bends and a micro-siting allowance of up to 50 m either side. Further

information on track construction is provided in Chapter 3 of the original ES and details of construction are provided in Figure 3.4 in the ES.

8.18 Construction of the access track would affect only a small part of the quarry and associated spoil heaps and would not affect any known structures associated with mining activities, or the mine entrance. The effect on the overall character of the asset would be of moderate magnitude (a material, partial alteration of character) resulting in an effect of moderate/minor significance (not significant in the context of the EIA Regulations 2017).

Proposed Mitigation

8.19 At the request of WoSAS (Table 8.1) a watching brief would be carried out during track construction works along the section where the proposed access track crosses the former quarry. The purpose of the watching brief would be to monitor any ground excavations and recover any archaeological information (including artefacts) that may be encountered.

8.20 No additional mitigation is required as a result of the amendments to the Proposed Development and the mitigation set out in the original ES (Chapter 7.101 – 7.108) remains valid.

Residual Construction Effects

8.21 There would be one residual effect of moderate/minor significance as a result of the revised Proposed Development. The completion of the programme of archaeological mitigation works set out in the original ES, and the specific mitigation outlined above in respect of the former ironstone mine (Asset 8), will be sufficient to minimise or offset the loss of any archaeological resource that may occur as a result of the construction of the Proposed Development. Taking the mitigation into account, any residual effect in relation to direct effects on the cultural heritage resource within the Proposed Development Area would be of no more than moderate/minor significance (not significant in the context of the EIA Regulations 2017).

Operational Effects

Predicted Operational Effects

8.22 As set out above, as a consequence of the relocation of turbines, the turbine envelope has been extended slightly, which has a commensurate effect on the extent of the wider study area. A comparative blade tip height ZTV is provided as Figure 10.10 of the FEI, in Chapter 10: Landscape and Visual Assessment. This shows that there is very little change to the visual envelope and predicted visibility; consequently there is no material difference to the assessment of the effects on the setting of heritage assets presented in this FEI.

8.23 The deletion of turbine T4 results in a reduction in the maximum number of turbines potentially visible from any one receptor from 11 to 10; this being most applicable in regard to assets to the north of the Proposed Development. The reduction by one

turbine in some instances would not result in a material change to either the magnitude of predicted effects or the significance of the resultant effects. No additional assets in the wider study would receive an effect on their settings and the assessment of the effects on the setting of heritage assets presented in the original ES remains valid.

Summary

8.24 A review has been carried out for the amendments to the Proposed Development. The assessment has been informed by responses to consultations on the original ES provided by Historic Environment Scotland and WoSAS and additional consultation with WoSAS.

8.25 The proposed amendments to the Proposed Development have resulted in a predicted direct effect on one heritage asset (Asset 8), of local importance and low sensitivity. The effect is predicted to be of moderate/minor significance (not significant in the context of the EIA Regulations) and mitigation is proposed to offset the predicted effect. The mitigation proposed has been agreed by WoSAS as being appropriate for the predicted effect.

8.26 All other effects reported in Chapter 7 of the original ES, and the mitigation proposed to offset any potential effects, remain valid for the amendments to the Proposed Development.

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FURTHER ENVIRONMENTAL INFORMATION
CHAPTER 9: COAL MINING RISK ASSESSMENT

March 2018

9 Coal Mining Risk Assessment

9.1 A Coal Mining Risk Assessment was carried out and submitted in the original ES, submitted as Technical Appendix 12.8. The original Coal Mining Assessment addressed the entire site, however it was clear from an early stage that the northern portion of the site around Over Hill, Mid Hill, Loch Rig, Martyrs Moss and Bught Knowe although underlain by Carboniferous age strata was not underlain by coal workings so was discounted from the assessment. It was clear that only the area to the south of the site presented any evidence of coal mining with a couple of small ironstone working areas identified in the Mining Constraints plan (Figure 9.1) included in the Coal Mining Risk Assessment.

9.2 The Coal Authority Response (dated 29th June 2017), Planning Application: 17/0395/PP, responded to the Coal Mining Risk Assessment and indicated that it had **No Objection** to the planning application.

9.3 To further clarify issues raised by East Ayrshire Council we have summarised the points raised below.

9.4 The development site has an area identified as High Risk Development, which was clearly identified in Figure 9.1, indicating all areas of mining, including coal and ironstone mining, this was based on review of over 20 mine abandonment plans for both underground and opencast mining. SLR Consulting originally undertook a Coal Mining Report targeted on an original layout with two potential borrow pits and a construction compound located overlying coal workings. The evidence from the Coal Mining Report was sufficient to indicate a more detailed assessment of mining risk was required, so it was determined further Coal Authority Reports were not required however a detailed coal mining risk assessment was required and undertaken.

9.5 Based on evidence from the Coal Mining Risk Assessment, the site was split into two areas, the area to the north of Lingie Hill and Reeve Knowe (no mining) and the area to the south (High Development Risk) as shown on the Coal Authority Interactive map. The interactive map http://mapapps2.bgs.ac.uk/coalauthority/home.html indicated the following points related to mining in the vicinity of the turbine layout (i.e. the northern portion of the site):

- No mine entries to the north of the site
- No catalogued mine plans
- It is not in a not in a Development High Risk which is defined as an area which contains one of more recorded mining features which have potential for instability.
- No coal outcrop
- No past or probable shallow coal mine workings

9.6 It is quite clear therefore that there is no mining activity to the north of the site in the vicinity of the turbines.

9.7 The Coal Mining search for abandonment plans revealed up to 18 seams and over 13 shafts, the Coal Authority have indicated many more shafts (up to 44 No.) which is not unexpected from the plans shown. The exact location of all of these is unknown, but it can

be safely assumed they are located primarily within the mining High Risk Development area, with a couple of old mining adits located on the ironstone workings to the north, near Green Knowe and south of Burnt Knowe. The shaft sites are not anticipated to impact any of the development, primarily as the track and construction compound are located partly over restored opencast and in areas where workings are deep. There is no evidence of any shaft locations along the track alignment.

9.8 The southern area of the development site has been extensively mined and the Coal Mining Risk Assessment outlines this with a complete succession of georeferenced plans.

9.9 The current layout avoids most of the workings however any areas at or close to the mine workings (such as the borrow pit and construction compound) may require additional site investigation prior to development. The construction compound is only a temporary feature, and could be located over infilled opencast as there will be no significant settlement issues for a feature of this nature. The borrow pit location is located outside the area identified as opencast, although located close or over past underground workings. These however are unlikely to impact development of a borrow pit, as the depth to workings (over 50m) will mitigate risk.

9.10 The points regarding mining therefore have been addressed as part of the FEI and based on the consideration that the Coal authority did not object to the Planning Application, no further work is required at this stage.

9.11 The new track layout recently added as part of the revised submission, extends from the turbine area past the borrow pit and connects with the existing access track. This track was designed to avoid deeper peat and to allow the infrastructure to be accessed without crossing deep peat. The track avoids the deep mine workings to the south, however it crosses an area of disturbed ground formerly a small ironstone working at Green Knowe, identified as Green Knowe quarry. It is not anticipated that this will impact the track as it was a small area which was exploited along outcrop. This would be investigated prior to commencing on site, no underground workings are anticipated below the track.

Borrow Pit Assessment

9.12 A Borrow Pit Assessment was carried out and submitted in the original ES, submitted as Technical Appendix 12.7. The borrow pit is located in an area planted with coniferous trees, it is underlain by glacial till, in turn overlying Carboniferous age bedrock. The site is not underlain by opencast mining and the underground mining is at a sufficient depth below surface to mitigate risk.

9.13 Most of the recommendations identified by East Ayrshire Council would be addressed post consent as planning conditions, including site investigation, details to be included in the CEMP and a full description of pollution prevention measures prior to construction commencing.

9.14 The design of the new access track is included in the current ES and referred to in this FEI..

9.15 No changes will be made to the borrow pit assessment.

9.16 In the consulation response received from Ironside Farrar on behalf of East Ayrshire Council the following was noted:

> *'The presence of shafts and adits are identified as being a medium risk and overall they have commented that the site development should be considered ranging from low risk with some areas of medium risk. The Coal Authority is disappointed that the report does not go on to make any recommendations based on these conclusions'.*

9.17 The above advice was considered and comments on the shafts have been incorporated into the above assessment.

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Over Hill

FURTHER ENVIRONMENTAL INFORMATION
CHAPTER 10: LANDSCAPE & VISUAL ASSESSMENT

March 2018

10 Landscape & Visual Assessment

Introduction

10.1 This chapter of the FEI presents supplementary information on landscape and visual matters and an assessment of the revised wind farm layout changes to the proposed Over Hill Wind Farm. This chapter of the FEI has been undertaken by Stephenson Halliday Ltd, chartered Landscape Architects responsible for preparation of the LVIA which formed part of the Over Hill Wind Farm Environmental Statement (May 2017).

10.2 The revised design changes have been developed following concerns raised by SNH regarding the most sensitive blanket bog at Martyr's Moss. Further information is available in the Design Approach: FEI Layout section of this chapter.

10.3 The cumulative situation has also been reviewed within 35km of the proposal and updates included in the assessment.

10.4 The Residential Visual Amenity Assessment (RVAA) has also been updated and is included as a separate document alongside the FEI.

Approach to the Assessment

10.5 The methodology used in this FEI is consistent with the approach in the ES and therefore has not been repeated here. This supplementary assessment follows the same stages of analysis (and criteria for evaluating the significance of potential effects) as presented in the ES. There has been little change in the baseline since the ES and therefore this has not been considered in this FEI, except for the adoption of the Supplementary Guidance: Planning for Wind Energy in November 2017. Instead the assessment focuses on potential changes to the assessed level of effect on key landscape and visual receptors during the construction/decommissioning and operational phase of the proposed Over Hill Wind Farm.

10.6 The scope of this supplementary information is summarised as follows:

- **Review of Post-Submission Comments** – including feedback from the East Ayrshire Council Audit and Scottish Natural Heritage;
- **Design Approach to Revised Layout** – including a review against the design considerations;
- **ZTV and Viewpoint Analysis**, with reference to any potential change in the nature / extent of visibility at each of the LVIA Viewpoints included within the ES and the additional viewpoints at Scottish Dark Sky Observatory, Craigengillan. In addition, a comparative Zone of Theoretical Visibility (ZTV) has been prepared to compare potential visibility of the FEI Layout in comparison with the ES layout;
- **Assessment of Construction and Decommissioning Effects** based on changes to FEI proposals.
- **Assessment of Operational Landscape Effects** based on the FEI proposal;
- **Assessment of Operational Visual Effects**, including that on the visual amenity of residents, road users / rail passengers and recreational receptors; and

- **Cumulative Landscape and Visual Impact Assessment**, an update of the cumulative situation within 35 km cumulative study area has been included and any notable changes identified.
- **Summary**, of changes as a result of the FEI layout.

10.7 The assessment within this FEI is supported by the updated figures and visualisations contained within the FEI (Volume 2), which are based on the FEI Layout. The FEI is also supported by updated cumulative figures and visuals contained within the FEI (Volume 2), which are based on the FEI Layout and the updated cumulative situation.

Review of Post-Submission Comments

10.8 Following submission of the planning application for Over Hill Wind Farm in May 2017, an FEI in June 2017 was submitted which included additional cumulative wireframes as requested by EAC. Post-submission comments in relation to the LVIA issues were raised by EAC and SNH. These comprise the Audit of the LVIA prepared by Ironside Farrar (IF Audit) Ltd on behalf of the EAC dated August 2017 and the SNH consultation response dated 31 August 2017.

10.9 SNH have not objected to the proposed development on landscape and visual grounds and the IF Audit is generally supportive concluding that the anticipated landscape, visual and cumulative effects would be limited in extent. The key comments are detailed in Table 10.1.

Table 10.1: Post-Submission Responses

Consultee	Comment	Response
SNH 31 August 2017	*LVIA: 3.15* *The current layout broadly results in a coherent and well-designed scheme in most views. The turbines are generally well-spaced in a clearly horizontal layout.*	This is acknowledged and the revised layout seeks to maintain this coherent design from most views.

SNH 31 August 2017	*LVIA: 3.15* *However we advise that a reduction in height of the proposed turbines could be noticeable and would be particularly beneficial from the following locations:* *VP5: Burnside - where turbines would be seen behind/above the trees on the skyline of the low hill behind Sunnyside/Whitehill. This is a smaller-scale, more intimate part of the landscape which has been somewhat underplayed in the LVIA. Where visible above the trees, the turbine blades would dominate these smaller-scale features. This would also remove potential cumulative visibility along this road in combination with the existing schemes at Hare Hill / Afton and with recently consented South Kyle Wind Farm located roughly 5 – 10km from Overhill.* *VP6: Rankinson – from where part-blades would be seen above the eastern skyline. A small reduction in height would likely remove turbines in views from this settlement*	A reduction in the height of the turbines is not an economically feasible option, due to changes in the subsidy regime. The LVIA assessed the effects on residents at these two viewpoints to be Moderate/minor. The IF Audit on behalf of EAC concurred with this assessment.
SNH 31 August 2017	*LVIA 3.16* *Should redesign of the scheme be necessary due to natural heritage or other constraints then we advise that any subsequent design iteration is subject to a revised / updated Landscape & Visual Impact Assessment*	This point is acknowledged and the redesign has been subject to further consultation with SNH, EAC and the LVIA has been updated in this chapter of the FEI.
EAC: IF Audit August 2017	***Section 3: Overview of Assessment*** *The LVIA is comprehensive and well-presented appraisal of the likely landscape and visual impacts of the proposals. The reasonings behind the different stages of the assessment are clearly set out, backed up by technical appendices including a good level of supporting detail.* *Overall, we have few criticisms of the methodology applied in the assessment, and most of the findings are well reasoned. We have the following limited comments on the assessment as follows:*	Acknowledged and addressed below.

EAC: IF Audit August 2017	*1) Visual Effects at New Cumnock (VP11): We agree with the assessment of a low magnitude impact resulting in a moderate adverse visual impact to residents at the VP. However, we judge this effect to be significant due to i) the prominence of the windfarm skylined on the western horizon ii) the orientation or properties in this direction. Over Hill would also contribute significantly to cumulative effects from this viewpoint, in both cumulative scenarios;*	We agree with a moderate effect for residents near the viewpoint, however whether this is significant is the area of disagreement. However, the audit also acknowledges that this level of effect would only be experienced from localised parts of the settlement. This will be considered further in the Operational Visual Effects section. The cumulative effects at New Cumnock will be assessed in the Cumulative Effects section.
EAC: IF Audit August 2017	*2) The Assessment of Cumulative Effects: It is not always clear whether the 'additional' effect of Over Hill, when added to an already significant cumulative baseline, is also a significant effect. For example, the cumulative assessment at VP11 states only that Over Hill would augment an already significant cumulative effect at this VP for the existing/ consented/ application windfarm scenario (S2).*	Further clarity has been given with regard to the additional effect of Over Hill in the cumulative scenario.
EAC: IF Audit August 2017	*4) Cumulative Developments: South Kyle Wind Farm is now a consented development and therefore relevant to the S1 operational/ consented cumulative scenario. We identify some significant cumulative effects with the inclusion of South Kyle to this scenario, including to parts of New Cumnock, from Upper Beoch and some path close to VP1, where views to Overhill and South Kyle would be possible.*	The latest cumulative situation has been included in the updated cumulative assessment below and includes South Kyle as part of the fully consented baseline scenario. There have been some potentially significant cumulative effects identified with the fully consented baseline.
EAC: IF Audit August 2017	*5) Visible Aviation Lighting: We note from the ES that visible aviation lighting is assumed not to be required. The MOD consultation response of 07/07/17 highlights a requirement for either infrared or visible lighting, and therefore the potential for visual impacts of lighting remain uncertain until lighting arrangements are finalised.*	Infra-red lighting would be implemented if needed. Therefore there would be no visible lighting (or effects).

EAC: IF Audit August 2017	***Section 5: Overall Conclusions*** *5.27 Over Hill wind farm would be located within a landscape identified in the EALWCS as potentially able to accommodate a wind farm development of a 'large' turbine typology. The proposals would have some impact to the character of the adjacent settled landscape of the Upland Basin to the east, but this effect would be relatively limited in extent. The proposals would not significantly affect the more sensitive landscapes of the Doon Valley, other parts of the EASLA or the other designated landscapes at Craigengillan and Dumfries House.*	This conclusion supports the capacity of the host landscape to accommodate a wind farm of the scale proposed and concurs with the ES LVIA in stating that the landscape effects would be relatively limited in extent. The revised layout would not lead to a change in this conclusion.
EAC: IF Audit August 2017	*5.28 There is relatively settlement within 7km of the turbines, and a limited number of significant adverse visual effects would be experienced from properties, roads and paths within this distance. The greatest concentration of visual receptors likely to experience significant effects from the proposals would be those in parts of Ochiltree (7.7km), from which the proposals would appear quite prominently on the southern horizon. Some significant effects would also be experienced from limited parts of New Cumnock (9.5km), albeit at this distance only just above the threshold of significance. Overall, significant adverse visual effects are unlikely to be widespread or affect large numbers of visual receptors.*	This conclusion supports the extent of visual effects of Over Hill. The revised layout would not lead to a change in this conclusion.
EAC: IF Audit August 2017	*5.29 Significant cumulative effects with existing and consented wind energy development would be limited, however the proposals would potentially contribute significantly to cumulative landscape and visual effects with the various wind farms proposals around the Upland Basin, and also the proposed Polquhairn wind farm in views from the north.*	This conclusion supports the extent of potential cumulative effects of Over Hill. The revised layout would not change this conclusion. Since IF Audit was prepared, both Garleffan and High Park II have been refused (but are still within Judicial Review or Appeal windows) and their removal from the cumulative scenario would further reduce the potential for cumulative effects.

Design Approach to Revised Layout

10.10 As described in Section 2 Wind Farm Design Development (of this FEI), following receipt of the post-submission comments, the layout has been redesigned to reduce effects on the most sensitive blanket bog at Martyr's Moss. Further consultation has been undertaken with EAC and SNH with regards to potential design alterations to mitigate effects on this receptor and the related landscape and visual effects.

10.11 The layout in the ES (the 'ES Layout') comprised 11 turbines at 149.9m to blade tip. The revised 'FEI Layout' seeks to mitigate effects on the peat bog habitat and incorporates the removal of turbine 4, the re-positioning of turbine 7 to a location approximately 700m southeast with micro-siting adjustments of 50m-100m for turbines 6, 10 and 11 along with adjustments to the track layout and associated crane pads. Further details are listed in Table 2.1 of this FEI and the layout is illustrated on Figure 3.1.

10.12 The FEI Layout therefore comprises 10 turbines at 149.9m. The proposed coordinates of the turbines T1, T2, T3, T5, T8, and T9 remain unaltered from those proposed in the ES. The numbering from the ES has been retained. However it is noted that in the ES the numbering in the wireframes for turbines 5-8 did not correspond with the turbine numbering on Figure 1.2 Proposed Turbine Layout. This has been corrected to be consistent in the FEI, but as a result the numbering in the wireframes of the ES and FEI might not be directly comparable. A comparison of this numbering is shown in Table 2.1.

10.13 The landscape and visual considerations of the redesigned layout, include maintaining the design as set out within the ES. This includes the design guidance from '*Siting and Designing Windfarms in the Landscape'* Version 3 (SNH, 2017), which for ease of reference is repeated below:

- The proposed layout of wind turbines should present a clearly structured, balanced arrangement which relates to the underlying landscape characteristics of a similar scale and/or prominence, landform composition and the key characteristics of the landscape of the Site and surrounding area;
- The layout design should respond to the key landscape features and grain of local topography;
- The design of a wind farm composition from key viewpoints and sequential routes should be an overriding factor in layout design to achieve a simple balanced composition in terms of the overlap relationship between turbines, skyline effects and back-grounding;
- Careful consideration is needed in the siting and design of wind farms, and between wind farms, to avoid confusing the sense of visual perspective;
- Attention should be given to other design issues, including turbine colour, size, siting, design and form of the sub-station/control building and alignment of access tracks to ensure this relates to the key characteristics of the landscape.

10.14 The design considerations also included those within the planning policy supplementary planning guidance '*East Ayrshire Landscape Wind Capacity Study*' 2013 (EALWCS) included in Table 6.4 of the ES.

Table 10.2: Design Considerations from Table 6.4 of ES with FEI design approach

Source (quoted from ES)	***Consideration (quoted from ES)***	***ES Design Approach (quoted from ES)***	**FEI Design Approach**
Effects on landscape character	*Supplementary Guidance within the EALWCS states that the host LCT – the Foothills with Forest and Opencast Mining (17a) LCT subtype, is of Medium landscape sensitivity to wind energy development of the scale proposed.* *It also suggests that turbines should be set well back from the more sensitive north-eastern, eastern and south-western edges of these foothills to avoid significant impact on smaller scale settled landscapes and to also minimise potential cumulative effects with operational wind farms seen from the Upland Basin (15) character types*	*Guidance within the EALWCS, and site-specific analysis, is described in greater detail in paragraph 6.121 onwards within this chapter.* *The Site is located in an extensive upland plateau which benefits from the topographical containment by surrounding hills and forestry. It is a large scale landscape with simple patterns and low levels of human settlement. Overall the landscape in the vicinity of the Site is considered to be of medium sensitivity to the Proposed Development.* *The design process has considered alternative turbine numbers, heights and layouts with the aim of reducing effects on existing landscape character, as well as enhancing the visual composition as experienced from adjacent areas.*	The location of the wind farm is in the same Site and therefore there are no changes to this aspect of the design.
Potential effects on designated landscapes	*The Proposed Development Area is not located within a landscape designation, although there are a number within 10 km of the proposed turbines.* *In their scoping response, SNH specifically referred to the Wild Land Area at Merrick.*	*The design process has sought to avoid significant effects upon landscape designations within the study area. From open vantage points within them, the design process has sought to ensure the Proposed Development would form a cohesive, balanced array.*	The IF Audit stated that they did not consider there to be any significant effects on landscape character within any of the designated landscapes, however they did acknowledge there were some significant visual effects within nearest two EASLA. Given the separation distance of any designated landscapes, the redesign has maintained a generally cohesive balanced array in relation to intervisibility with designated landscapes.

Source (quoted from ES)	***Consideration (quoted from ES)***	***ES Design Approach (quoted from ES)***	**FEI Design Approach**
Potential effects on landscape character and fabric due to forestry felling	*The Proposed Development Area incorporates existing areas of commercial forestry. Some areas would be felled to facilitate the addition of the Proposed Development.*	*The approach to felling within the Proposed Development Area would be based on localised felling to minimise the extent of tree loss. Mitigation / replacement planting would be included to compensate for the localised areas of felling (see Figure 6.13).*	There are increased amounts of felling on Site as a result of the FEI proposal and further restoration to bog habitat than was previously proposed. The revised proposals for forestry, open areas and wind turbines have been carefully considered to maintain a cohesive design relationship of the wind farm in the open areas. Some limited additional areas of felling have been included to maintain this spatial relationship.
Potential cumulative effects / pattern of development	*EAC and SNH's scoping responses noted a number of cumulative sites within the surrounding area.*	*Cumulative effects are considered fully in Appendix 6g.*	Due to the separation distance of any cumulative sites, the revised design would have little change on this aspect. However, there have been some changes in the surrounding cumulative situation which are considered in more detail below.
Potential skyline effects	*The EALWCS states that the outer slopes of the Foothills with Forest and Opencast Mining (17a) LCT subtype form a containing edge to neighbouring LCTs (including the Upland River Valley (10) to the south west, the Upland Basin (15) to the east and the East Ayrshire Lowlands (7c) and Lowland River Valley (9) to the north east.* *The EALWCS notes that the hills and shallow basins within the core of these uplands are more visually contained.*	*The Proposed Development would be located in an elevated upland plateau which benefits from the topographical containment of surrounding hills (including Rig Hill to the south / south east, High Mount and Carsgailoch Hill to the north east, Green Hill and Stannery Knowe to the north west, Benbain and Benbeoch to the south west).*	The location of the site has not changed and therefore still benefits from the topographic containment. There is little change to this aspect and the composition of the revised array of turbines on the horizon has been carefully considered.

Source (quoted from ES)	***Consideration (quoted from ES)***	***ES Design Approach (quoted from ES)***	**FEI Design Approach**
Variation in ground level across the Proposed Development Area.	*To obtain the best composition, there is a requirement to ensure visual consistency of turbines on the skyline despite the undulations within the Proposed Development Area itself.*	*The design development process has considered the underlying landform – in particular the changes in elevation within the Proposed Development Area. The final layout incorporates turbines at elevations of 286 – 315m AOD. Design analysis shows that the proposed turbines would appear consistent in height in views from surrounding areas.*	Turbine 4 has been deleted and turbine 7 has moved 680m southeast to an area of ground approximately 30m lower in elevation. Three other turbines have shifted position 50-100m away without a notable change in their elevation. Despite these changes, the horizontal aspect of the layout has been maintained. The reduction in the elevation of Turbine 7 is noticeable in the view from some directions, but mostly it is seen as a slight tapering to the end of the array for example in Viewpoints 7, 12, and 21.

10.15 The revised FEI layout has resulted in the repositioning of turbines away from the centre of the array to retain the sensitive bog habitats but has retained the strong design relationship of the array within its landscape character setting.

ZTV and Viewpoint Analysis

Zone of Theoretical Visibility Analysis

10.16 The revised ZTV maps have been illustrated in updated Figures 10.6 - 10.17. Figures 10.10 and 10.11 are comparative Blade Tip ZTVs of the previous ES and FEI layouts, which illustrate that the change in ZTV coverage would be extremely limited. Within 15km, there would be a marginal reduction of visibility predicted in Cumnock to the north and a marginal increase in theoretical visibility within unsettled areas to the south and east.

Viewpoint Analysis

10.17 Viewpoint analysis has been undertaken based on the FEI Layout to assess any potential change in the nature / extent of visibility at each of the LVIA Viewpoints (in comparison to those described in the ES).

10.18 The locations of the viewpoints considered in this FEI are illustrated on updated Figures 10.6 to 10.17, whilst the updated visualisations (comprising photographs of the existing view, wireframes and photomontages) are illustrated with reference to Viewpoints 1 to 23 plus 24. The findings of the viewpoint analysis are described below in Table 10.3 (with reference to the results of the viewpoint analysis from the ES). Distances are listed in relation to the nearest turbine to the FEI layout with any changes from the ES noted.

Table 10.3: Viewpoint Analysis

Viewpoint No.	Viewpoint	Distance from nearest FEI turbine	Level of effect reported in ES	Changes in composition of view of FEI layout compared to ES layout	Resultant change
1	B741 near Maneight	2.9km (3.2 km from ES layout)	Foothills with Forest and Opencast Mining (EA17a) LCT - **Major/moderate (Significant)** Residents – **Major (Significant)** Road Users – **Major/ moderate (Significant)**	The change in the composition of the view is noticeable but on balance comprises a very similar array when compared with the ES layout. The relationship of the array to the felling proposals and open areas of the local landscape would be visible from this location.	**No change** in the level of effect reported in ES for either landscape or visual receptors at the viewpoint.
2	B7046 near Skares	4.3 km	East Ayrshire Lowlands with Opencast Mining (EA7c) LCT - Moderate/minor (not significant) Residents – Moderate (not significant) Road Users – Moderate/ minor (not significant)	The changes in the layout would be difficult to discern at this viewpoints given the screening effect landform and intervening forestry on the skyline.	**No change** in the level of effect reported in ES for either landscape or visual receptors at the viewpoint.
3	Dalgig Road	4.8km (5.1 km from ES layout)	Upland Basin with Opencast Mining sub type (EA15) LCT - Moderate and not significant Road Users – Moderate (not significant)	From this viewpoint, there is a shift of the array to the left (south west) and a slightly larger gap between turbines but given the extent of screening by landform, the impression of the array would be very similar to the ES layout.	**No change** in the level of effect reported in ES for either landscape or visual receptors at the viewpoint.

Viewpoint No.	Viewpoint	Distance from nearest FEI turbine	Level of effect reported in ES	Changes in composition of view of FEI layout compared to ES layout	Resultant change
4	B741 near Dalleagles	4.7km (5.1 km from ES layout)	Upland Basin with Opencast Mining sub type (EA15) LCT - Moderate/minor (not significant) Residents – Moderate (not significant) Road Users – Moderate/ minor (not significant)	There is reduced overlapping of turbines and in the wireframe, but the blade tip of turbine 1 appears as an outlier to some degree. Initially this would be screened by forestry and landform from the opencast site. However if the timing of the forestry being felled and this part of the opencast site is restored to lower levels than current bunding, then this blade may become visible.	**No change** in the level of effect reported in ES for either landscape or visual receptors at the viewpoint.
5	Burnside	6.0km (6.5 km from ES layout)	Upland Basin with Opencast Mining' sub type (EA15) LCT – Minor and not significant Residents – Moderate / minor (not significant)	The FEI layout presents a more even spread of turbines on the left (west) of the array. However, given the extent of screening by landform and deciduous tree cover on the skyline, the change is unlikely to be discernible.	**No change** in the level of effect reported in ES for either landscape or visual receptors at the viewpoint.
6	Rankinston	6.5 km	Foothills with Forest and Opencast Mining (EA17a) LCT - Minor (not significant) Residents – Moderate / minor (not significant)	There would be two less blade tips visible in the view but, the change is unlikely to be discernible.	**No change** in the level of effect reported in ES for either landscape or visual receptors at the viewpoint.
7	Ochiltree, near the A70	7.7 km	East Ayrshire Lowlands (EA7c) LCT - Moderate (not significant) Residents, and Walkers on Core Path – **Moderate (Significant)** Road Users – Moderate / minor (not significant)	The width of the array is slightly wider from this viewpoint but there is less overlapping of turbines in the FEI layout and the array still appears well balanced. Turbine 7 appears on lower ground but tapers the array to the left (south east) and appears to respond to landform.	**No change** in the level of effect reported in ES for either landscape or visual receptors at the viewpoint.

Viewpoint No.	Viewpoint	Distance from nearest FEI turbine	Level of effect reported in ES	Changes in composition of view of FEI layout compared to ES layout	Resultant change
8	New Cumnock Golf Club	8.3 km (8.6 km from ES layout)	Upland Basin (EA15) LCT - Moderate/minor (not significant) Recreational Receptors (Golf) – Moderate (not significant)	The array has slightly extended to the left (south west) and the wireframe suggests that the change may be more noticeable than it would appear on the ground, given the screening effect of local landform and deciduous woodland cover. There would be more turbines visible on the left side of the array, but the loss of turbine 4 represents a reduction in the extent of the noticeable array visible above the skyline.	**No change** in the level of effect reported in ES for either landscape or visual receptors at the viewpoint.
9	Auchenroy Hill (Craigengillan GDL)	9.0 km	Foothills with Forest and Wind Turbines West of the Doon Valley sub type (EA17b) LCT - Moderate/minor (not significant) Walkers – Moderate / minor (not significant)	There would be one less blade tip visible in the view but, the change is unlikely to be discernible.	**No change** in the level of effect reported in ES for either landscape or visual receptors at the viewpoint.

Viewpoint No.	Viewpoint	Distance from nearest FEI turbine	Level of effect reported in ES	Changes in composition of view of FEI layout compared to ES layout	Resultant change
10	Auchinleck	9.4km	East Ayrshire Lowlands (EA7c) LCT – Moderate (not significant) Residents – Moderate (not significant) Road Users – Moderate/ minor (not significant)	The repositioning of turbine 7 to the left (south) in this view has theoretically extended the array. However given the screening by landform this is unlikely to be noticeable, and is not visible due to the current forestry on the skyline. The extent to which the main cluster of turbines would be visible has reduced when compared with the ES layout and the two turbines visible to the left of the main group would be partially or predominantly screened by landform and forestry (which is a long term but not a permanent addition to the landscape). The two tips would be noticeable slightly separate from the main group but the overall presence of the array has been reduced.	**No change** in the level of effect reported in ES for either landscape or visual receptors at the viewpoint.
11	New Cumnock	9.1 km (9.5 km from ES layout)	Upland Basin with Wind Turbines sub type (EA15) LCT - Moderate (not significant) Residents – Moderate (not significant)	The removal of turbine 4 has opened up a small gap and turbine 1 appears slightly separate from the group but still reads as a single array. The overall impression of the array would remain similar. It should be noted that this viewpoint is not representative of the settlement of New Cumnock as a whole, just the residents located on higher ground with clear views.	Although there is a more noticeable change in the composition of the view, there would be **No change** in the level of effect reported in ES for either landscape or visual receptors at the viewpoint.

Viewpoint No.	Viewpoint	Distance from nearest FEI turbine	Level of effect reported in ES	Changes in composition of view of FEI layout compared to ES layout	Resultant change
12	A76	10.7 km	East Ayrshire Lowlands (EA7c) LCT - Moderate (not significant) Road Users – Moderate/ minor (not significant)	From this position, the array has extended to the left (south) and resulted in a reduction in overlapping. From here turbine 7 tapers the array on the left down to meet the landscape. Whilst the FEI layout is not as compact, it still reads as a cohesive and balanced array. Overall the impression of the wind farm would be similar.	**No change** in the level of effect reported in ES for either landscape or visual receptors at the viewpoint.
13	Mansfield Road (east of Mansfield)	10.7 km (11.0 km from ES layout)	Upland River Valley (EA10) LCT - Moderate (not significant) Residents – Moderate (not significant) Road Users – Moderate/ minor (not significant)	From this position on the road there is an increase in overlapping turbines in the FEI layout. However due to partial screening of the turbines on the right (west) side of the array, when viewed in the landscape, it still reads as a cohesive horizontal array. Overall the impression of the wind farm would be similar.	**No change** in the level of effect reported in ES for either landscape or visual receptors at the viewpoint.
14	Hillhead	11.4 km	East Ayrshire Lowlands (EA7c) LCT - Moderate/minor (not significant) Residents – Moderate/ minor (not significant)	From Hillhead, the removal of turbine 4 has removed overlapping and one further turbine has dipped below the horizon. However, at this distance the change is unlikely to be discernible.	**No change** in the level of effect reported in ES for either landscape or visual receptors at the viewpoint.

Viewpoint No.	Viewpoint	Distance from nearest FEI turbine	Level of effect reported in ES	Changes in composition of view of FEI layout compared to ES layout	Resultant change
15	Mauchline	13.6 km	East Ayrshire Lowlands (EA7c) LCT - Moderate/minor (not significant) Residents – Moderate/ minor (not significant)	From this position, the array has extended to the left (south east) and resulted in a slight reduction in overlapping. From here turbine 7 tapers the array on the left down towards the landscape. Whilst the FEI layout is not as compact, it still reads as a cohesive and balanced array. Overall the impression of the wind farm would be similar.	**No change** in the level of effect reported in ES for either landscape or visual receptors at the viewpoint.
16	Blackcraig Hill	13.3km (13.7 km from ES layout)	East Ayrshire Southern Uplands with Wind Turbines sub type (EA20a) LCT - Moderate/minor (not significant) Walkers – Moderate/ minor (not significant)	The removal of turbine 4 has resulted in less overlapping effects, however the relocated position of turbine 7 is more noticeable, leaving a small gap in the array and appearing lower than the other turbines. However, from this distance the changes whilst noticeable would still appear as a single array and relatively similar to the ES layout.	Although there is a more noticeable change in the composition of the view, there would be **No change** in the level of effect reported in ES for either landscape or visual receptors at the viewpoint.
17	Cairnsmore of Carsphairn	15.6 km (16.0 km from ES layout)	Southern Uplands with Wind Turbines sub type (DG19) LCT - Moderate/minor (not significant) Walkers – Moderate/ minor (not significant)	The removal of turbine 4 has resulted in less overlapping effects and turbine 7 is noticeable on lower ground. However, the array still reads as a cohesive and balanced array and from this distance the changes, whilst noticeable, would still result in a similar appearance in the landscape.	**No change** in the level of effect reported in ES for either landscape or visual receptors at the viewpoint.

Viewpoint No.	Viewpoint	Distance from nearest FEI turbine	Level of effect reported in ES	Changes in composition of view of FEI layout compared to ES layout	Resultant change
18	Glenalla Fell	18.9 km	Foothills with Forests and Wind Farms (SA17c) LCT – Moderate/minor (not significant) Walkers – Moderate/ minor (not significant)	The movement of the turbines is noticeable as a very small gap appearing in the centre of the array but it still reads as a cohesive and balanced group of turbines. At this distance the changes whilst noticeable would still appear relatively similar to the ES layout.	**No change** in the level of effect reported in ES for either landscape or visual receptors at the viewpoint.
19	Barnweil Monument	19.6 km	Lowland Hills (SA16) LCT - Moderate/minor (not significant) Visitors to monument – Moderate/ minor (not significant)	The removal of turbine 4 reduces overlapping and the move of turbine 7 has resulted in a tapering of the array to the left (south east) down towards the landscape. The array still reads as a cohesive and balanced group of turbines and at this distance would still appear similar to the ES layout.	**No change** in the level of effect reported in ES for either landscape or visual receptors at the viewpoint.
20	Brown Carrick Hill	22.9 km (23.0 km from ES layout)	Coastal Headlands: Brown Carrick Hills (SA4b) LCT - Moderate/minor (not significant) Walkers – Moderate/ minor (not significant)	The removal of turbine 4 has left a very small gap on the left (east) in the array but it still reads as a cohesive and balanced group of turbines. At this distance the changes whilst noticeable would still appear relatively similar to the ES layout.	**No change** in the level of effect reported in ES for either landscape or visual receptors at the viewpoint.
21	Cairn Table	23.0 km (23.1 km from ES layout)	East Ayrshire Plateau Moorlands (EA18a) LCT - Minor (not significant) Walkers – Moderate/ minor (not significant)	The changes result in T7 and T1 appearing to taper down on both sides of the array with some changes within the array but at this distance the changes would be marginal.	**No change** in the level of effect reported in ES for either landscape or visual receptors at the viewpoint

Viewpoint No.	Viewpoint	Distance from nearest FEI turbine	Level of effect reported in ES	Changes in composition of view of FEI layout compared to ES layout	Resultant change
22	Shalloch on Minnoch (Wild Land)	23.5km (23.4 km from ES layout)	Rugged Uplands, Lochs and Forests (SA21) LCT - Moderate/minor (not significant) Walkers – Moderate/ minor (not significant)	The FEI layout reduces overlapping turbines and presents a more balanced array but at this distance the changes would be marginal.	**No change** in the level of effect reported in ES for either landscape or visual receptors at the viewpoint
23	Bail Hill (north of Kirkconnel)	23.3 km (23.7 km from ES layout)	Southern Uplands with Forest (DG19a) LCT - Minor (not significant) Walkers – Moderate/ minor (not significant) Road Users – Minor (not significant)	There is a small gap noticeable gap between T1 and T3 but at this distance the changes would be marginal.	**No change** in the level of effect reported in ES for either landscape or visual receptors at the viewpoint
24	Scottish Dark Sky Observatory, Craigengillan	11.2km	Due to the limited visibility of one blade tip only, no significant effects predicted.	There would be top of two blade tips theoretically visible in the FEI layout, but the changes would not be noticeable.	**No change** in the level of effect reported in ES for either landscape or visual receptors at the viewpoint

10.19 In terms of the change in visual composition of the array, from most views the FEI layout still results in a broadly coherent and well-designed scheme. The turbines remain generally well-spaced and the original horizontal appearance of the array has been maintained from most views. The only exceptions to this would occur at two of the viewpoints; New Cumnock and Black Craig, where turbine 1 appears slightly separate from the main array and turbine 7 is noticeable a bit lower than the others. However these changes have not resulted in any changes to the levels of assessment presented in the ES.

10.20 The extent of significant visual effects would still be very limited (in accordance with the findings of the ES and the Ironside Farrar Audit). Beyond this the proposed Over Hill wind farm would represent a more distant, although sometimes noticeable, feature in the wider landscape setting where its overall effect would not be significant.

Construction and Decommissioning Effects

10.21 The revised proposal has included an increased amount of track (from 9,2km to 11.4km) of which 2.9km is existing on site and increased forestry felling for the purposes of bog restoration on site. An area of search has been identified as suitable for compensatory forestry planting, mainly off site.

10.22 These changes would have the potential for changed construction and decommissioning effects on the landscape fabric and character of the area. There would be increased effects as a result of forestry felling at the outset to accommodate the wind farm and facilitate the bog restoration on the fabric of the site. However the level of effect assessed within the ES on both landscape fabric and landscape character would remain at Moderate and not significant.

Operational Landscape Effects

10.23 The increased amount of tracks, one less turbine, increased extent of bog restoration and off site forestry compensation planting would all lead to some direct changes on the landscape. The increased bog restoration, assuming the compensation forestry planting would not occur on existing bog areas, would lead to some beneficial effect on the landscape fabric of the site. The removal of forestry would be compensated by additional forestry planting and therefore the change in fabric would be short to medium term. The reduction in the number of turbines would also lead to some beneficial effects compared to the ES proposal. However, the increased length of tracks would result in a slight increase to adverse effects on landscape fabric. On balance, the level of effect on landscape fabric would remain Moderate/minor adverse and not significant.

10.24 The changes to the FEI proposal may also lead to some changes to the effects on landscape character. However, given the nature of the revised FEI design proposal, there would be no changes to the effects reported in the ES on the host landscape key characteristics, Foothills with Forest and Opencast Mining (EA17a) LCT. The effect of the FEI proposal on this host LCT would remain at Moderate and significant, as reported in the ES.

10.25 The effect of the FEI proposal on the adjacent Upland Basis (EA15) LCT would also remain at Moderate and significant in localised western parts of the Upland Basis but not significant for remaining part of the Upland Basis LCT, as reported in the ES.

10.26 The effect of the FEI proposal on the adjacent Southern Uplands with Forestry (EA20c) LCT and East Ayrshire Southern Uplands (EA20a) LCT within approximately 5km of the proposal would also be significant. But there would be no change to the levels of effect reported in the ES.

10.27 There would be no change to the level of effect reported in the ES on the remaining landscapes within the study area, which was reported as not significant.

10.28 With regard to the designated landscapes, as stated in the ES, there would be some localised areas of potentially significant effects within parts of the East Ayrshire Sensitive Landscape Areas (EASLA) at Doon Valley (3.4km to the south west) and Southern Uplands/Nith Valley Plateau Moorland (3.2km east and north). However this did not translate to significant effects on these designations as a whole. The changes to the FEI layout would not change the levels of effect reported on these two areas.

10.29 Nor would the FEI layout change the other levels of effect reported on other designated landscape, which were all considered not to be significant.

Operational Visual Effects

10.30 The operational visual effects of the proposed Over Hill wind farm are assessed below based on the FEI Layout. The assessment focuses on the key visual amenity of residents, road users / rail passengers and recreational receptors.

Residential and Settlements

10.31 There is relatively little settlement within 5-7km of the proposal. The ES identified potentially significant effects from one dwelling within 2km at Upper Beoch and at the settlement of Ochilltree. The Irronside Farrar Audit indicated that they believed there to be significant effects in parts of New Cumnock.

10.32 The change in the view from Upper Beoch represents the visual receptor with the greatest extent of change as a result of the revised FEI layout. The distance has remained similar at 1.7km from the nearest turbine, however the extent of the view influenced by the turbines has increased but one less blade tip would be visible. The array would appear further to the north east when compared with the ES layout as a result of the relocation of turbine 7 to the east. Intervening landform would still screen most of the ground level infrastructure and two of the turbines above hub height. The nearest forestry, which is not subject to removal for the wind farm, would continue to provide screening to the lower parts of the turbines and reduce the extent of visibility of the array. The photomontage illustrates that the upper part of six turbines, as well as the blades / tips of a further four turbines would be visible from north-facing windows. The magnitude of change would be Substantial and the level of effect would continue to be Major and significant, consistent with the ES LVIA.

10.33 At Ochilltree, the ES identified a Moderate and significant effect and although the width of the array is slightly wider than the ES layout, the array still appears well balanced. No change is predicted on the level of effect at Ochilltree as a result of the FEI proposal.

10.34 At New Cumnock, over 9km east of Over Hill, the ES identified a Moderate but not significant visual effect on residents. The Ironside Farrar Audit agreed with a Moderate effect, but stated they felt it was significant. However they did, acknowledge that 'this would be a relatively localised effect experienced from western fringes of the settlement with views to the proposals, and effects across the settlement as a whole would not be significant.' The removal of turbine 4 as a result of the revised FEI layout would be noticeable and open up a small gap in the array however the overall impression of the array would remain similar. There would be a noticeable change in the composition of the array, but the level of effect would remain Moderate and not significant.

10.35 No other significant effects have been identified and the FEI proposal would not lead to any further significant effects at settlements.

Road and Rail Users

10.36 Road users on the B741 as it passes south of Over Hill have been assessed as experiencing a significant visual effect. The changes as a result of the FEI layout and revised forestry felling and habitat creation would be clearly visible, see Viewpoints 1 and 4. Although these changes would be noticeable the array would have a similar appearance in views experienced from this road and therefore there would be no change in the level of effect reported in the ES (ranging from Major/moderate and significant to Moderate/minor and not significant).

10.37 No other significant effects have been identified and the FEI proposal would not lead to any further significant effects for road or rail users.

Recreational Receptors

10.38 Recreational users on Public Rights of Way and Core Paths within 5km, where there is unrestricted visibility towards Over Hill, as well as those located between Over Hill and New Cumnock (east) and between Ochilltree and Drongan (to the north west) have been predicted to experience some significant effects. Although the composition of the views may be noticeable as a result of the FEI Layout, there would be no change in the level of effects reported in the ES on these receptors.

10.39 No other significant effects have been identified and the FEI proposal would not lead to any further significant effects for long distance footpath users, those on promoted cycle routes, other Public Rights of Way, Core Paths or recreational routes / attractions.

Cumulative Assessment

10.40 The following section presents an update to the Cumulative Landscape and Visual Assessment (CLVIA) in association with the FEI Layout. A full update of the cumulative situation within the 35km cumulative study area has been undertaken and the results are

listed in Appendix 10.1. This updated situation is illustrated on the Cumulative Location Plans, Figures, ZTVs and Visualisations presented within this FEI.

10.41 In the ES, the agreed scope of the cumulative study area was 35 km from Over Hill Wind Farm. Within this 35 km area, significant cumulative effects arising in full, or in part, from the addition of Over Hill are considered to be most likely within a 15-20km radius of Over Hill. Accordingly this cumulative assessment is focussed within that area, but not to the exclusion of cumulative developments and effects beyond these distances where relevant.

10.42 Within 20km, the main changes since the ES was submitted has been that South Kyle, Knockshinnoch Farm, Benbrack and Windy Rig have been consented; Polquharin, Enoch Hill, Pencloe, Windy Standard III and Lethans are all still at various stages of the planning process waiting for decisions from Scottish Government; Garleffan was refused at Appeal (but currently still within JR window until mid April) and two turbines at High Park Farm II were refused by EAC (and still within its Appeal window until mid April). Ashmark v2 (east of Enoch Hill) is still in pre-planning stage.

10.43 The CLVIA draws from the assessment of landscape and visual effects as described in the ES and preceding sections of this report. This CLVIA has focussed on the effect of changes in the status of cumulative sites since the ES and the impact the changes to the FEI layout would have to any potentially significant cumulative effects.

10.44 This assessment draws on information provided within this FEI including updated Cumulative Location Plans, Cumulative Figures, Cumulative ZTVs and cumulative visualisations. As presented in the ES, viewpoints 7, 10, 11, 17 and 18 were selected as cumulative and the full 360 degree extent of cumulative visibility has been illustrated, where visible. For the remaining viewpoints, a single additional cumulative wireframe has been included in the direction of Over Hill. It should be noted that there is no cumulative visibility from viewpoints 2-5 in the direction of Over Hill.

Cumulative Effects on Landscape Character

10.45 In terms of effects on landscape character; assuming the prior presence of operational and consented development, this would now include South Kyle, Knockshinnoch Farm, Benbrack and Windy Rig into this scenario. There would be no new sites to consider in the other proposals scenario, but noting the status of both Garleffan and High Park II as both being refused.

Foothills with Forest and Open Cast Mining (EA17a)

10.46 With regard to the host LCT, Foothills with Forest and Open Cast Mining (EA17a), the ES identified that there would be some overlap of significant landscape effects associated with Over Hill with the existing characterising influence of the recently constructed SWS Connection to the west and the operational opencast mineral works to the east. The change to the FEI layout would not lead to any greater cumulative effects in this regard.

10.47 As stated in the ES, the addition of Over Hill would not result in any significant cumulative landscape effects in association with operational wind energy developments due to the separation distance, and this would remain the case for the FEI layout. With regard to the

consented developments, the two turbines at Knockshinnoch Farm are located within this LCT. However due to the geographic separation and screening effect of both landform and forestry there would be no coalescence of characterising influence of these two sites and no significant cumulative effects predicted in relation to Over Hill. No other consented sites (including South Kyle) are located either within or have enough visual influence on this LCT to cause any significant cumulative effects on the Foothills with Forest and Open Cast Mining (EA17a) LCT.

10.48 With regard to the other proposed development, Polquhairn is still a proposal (currently at Appeal) and located within this LCT. The ES stated that assuming the prior presence of the consented baseline and Polquhairn the addition of Over Hill would lead to a combined cumulative effect that would be considered significant within part of this LCT due to the spread of development (wind farm, 400kV pylons and opencast mining) and this would remain the case with the FEI layout. No other proposed sites (including Enoch Hill) are located either within or have enough visual influence on this LCT to cause any further significant cumulative effects on the Foothills with Forest and Open Cast Mining (EA17a) LCT.

Upland Basin (EA15) LCT

10.49 There are no operational, consented or proposed wind developments within Upland Basin EA15 LCT but there are extensive existing opencast mineral workings at the eastern end of this LCT. The key sites which are likely to have the potential for significant effects on this landscape are the combinations of the opencast mineral workings, High Park turbine (operational), South Kyle (now consented 3-4km south), Enoch Hill and Pencloe (both still proposals 2-3km south), High Park II turbines (refused but still within Appeal widow) and Garleffan (refused at Appeal but within JR window).

10.50 Assuming the prior presence of the operational (notably High Park Farm, Hare Hill and open cast mineral workings) and consented (notably South Kyle) wind farms, the addition of Over Hill (moderate in its own right) would not lead to significant cumulative effects on the Upland Basin EA15 LCT as a whole, although there would be some localised significant effects on separate parts of the Upland Basin as result of this scenario.

10.51 Assuming the prior presence of the operational baseline, consented and all other proposed wind developments (notably Enoch Hill, Pencloe, Garleffan and High Park II), there would be greater influence as a result of these proposals, particularly in western parts of the LCT. However there would be limited coalescence between the characterising influence of Over Hill and these other sites, and the characteristics of LCT EA15 would re-exert themselves across the intervening landscape within central parts of the character type. Therefore no additional significant cumulative effects are predicted, above those identified individually.

Southern Uplands with Forestry (EA20c) LCT

10.52 There are no operational wind developments within the Southern Uplands with Forestry (EA20c) LCT but South Kyle has recently been consented within this area. Pencloe is still a proposal and located at the eastern end of this area and Enoch Hill is part located within this area. These are the key sites which are likely to have the potential for significant cumulative effects on this landscape with others in the local area including the recently

consented Benbrack and Wind Standard (all) to the south, with Over Hill located to the north.

10.53 As stated in the ES, Over Hill would exert a characterising influence upon localised areas along the north western edge of LCT EA20c (see Viewpoint 1) and the FEI layout would not change this. With regard to the consented baseline, the addition of Over Hill, would result in a small amount of overlap between the characterising effects of Over Hill and those of the consented South Kyle in the vicinity of Maneight Hill, which represents a significant cumulative effect on landscape character within this area. Although there would be a localised cumulative effect, it would not have a significant cumulative effect for this occurrence of the LCT as a whole.

10.54 With regard to the operational, consented and other proposals scenario (mainly those noted above) the addition of Over Hill would lead to some localised cumulative effects in the vicinity of Maneight Hill (as noted in the ES), however its addition would not lead to further significant cumulative effects for this occurrence of the LCT as a whole.

East Ayrshire Southern Uplands (EA20a) LCT

10.55 There are no operational wind farm developments within the East Ayrshire Southern Uplands (EA20a) LCT, but the proposed Enoch Hill is located within it. This is the key site which is likely to have the potential for significant effects on this landscape with others in the local area including the recently consented South Kyle to the south and Pencloe proposal.

10.56 As stated in the ES, Over Hill would exert a characterising influence upon localised western parts of LCT EA20a (see Viewpoint 1) and the FEI layout would not change this. With regard to the consented baseline (mainly South Kyle), the addition of Over Hill, would result in a small amount of overlap between the characterising effects of Over Hill and those of the consented South Kyle at the western edge of the area, which represents a significant cumulative effect on landscape character within this area. Although there would be a localised cumulative effect, it would not have a significant cumulative effect for this occurrence of the LCT as a whole.

10.57 With regard to the operational, consented and other proposals scenario (mainly Enoch Hill) the addition of Over Hill would lead to some localised cumulative effects at the western edge of the area (as noted in the ES). However the effects associated with Over Hill would reduce at increased distance and its addition would not lead to further significant cumulative effects for this occurrence of the LCT as a whole.

Other Landscape Character Types

10.58 There were no other potentially significant cumulative effects identified in the ES as a result of Over Hill and the changes as a result of the FEI and the updated cumulative situation would not alter this assessment.

Cumulative Effects on Landscape Designations

10.59 The ES stated that there were localised significant landscape effects associated with Over Hill with the existing characterising influence of the SWS Connection within parts of the East

Ayrshire Sensitive Landscape Areas (EASLA). However, the addition of Over Hill would not result in any additional significant cumulative landscape effects in association with any other operational or consented development with the EASLA. This assessment has not changed as a result of the change in FEI layout, nor the change in cumulative situation (notably South Kyle consented).

10.60 With regard to other proposed development, Pencloe and Enoch Hill would be located within the EASLA, leading to significant (direct) effects in their own right across local parts of the designation. The addition of Over Hill would lead to some localised coalescence of characterising effects of Over Hill with Enoch Hill in the vicinity of Peat Hill, but its addition would not lead to significant cumulative effects on this designation as a whole.

10.61 The ES stated that Over Hill would not make a material contribution to significant cumulative effects within the South Ayrshire Scenic Areas, any Garden and Designed Landscape or area of Wild Land and the changes as a result of the FEI and the updated cumulative situation would not alter this assessment.

Cumulative visual effects

Cumulative Effects on Residents of Settlements and Dispersed Dwellings

10.62 The ES stated that the addition of Over Hill to a scenario incorporating only operational and consented development would not result in significant effects. There would be no change to this assessment as a result of the change in FEI layout.

10.63 At Ochiltree, the change of South Kyle and Knockshinnoch Farm becoming consented would lead to these wind farms becoming noticeable features on the horizon. Assuming the prior presence of these, the addition of Over Hill (moderate and significant in its own right) would lead to some significant cumulative effects.

10.64 With regard to the other proposals visible from Ochiltree, Polquhairn would be most noticeable on the southern horizon but Enoch Hill would also become visible behind South Kyle. Garleffan (if the decision was overturned) and Lethans could also appear as more distant features on the horizon. Assuming the prior presence of the operational, consented and all other proposals, the addition of Over Hill would lead to significant cumulative effects, primarily with Polquairn.

10.65 At New Cumnock, the operational sites of Hare Hill and High Park Farm are visible to the south east from this settlement as well as Afton from northern parts. The operational opencast workings to the west are also visible. The recently consented sites at South Kyle will also become a noticeable feature to the south west. Assuming the prior presence of operational and consented developments, there will be a Moderate effect, which is considered significant primarily as a result of High Park Farm Turbine and Hare Hill Wind Farm. The addition of Over Hill would augment the significant cumulative effects. However, this addition would not be sufficient to raise the combined cumulative level of effect above the threshold of Moderate and would not be considered significant.

10.66 In terms of other proposed development, there would be views of Garleffan to the north (if decision was overturned), and clear views of Pencloe and Enoch Hill on the horizon to the

south / south west. Other proposed development would be located at greater distance and exert very limited cumulative influence. Based on the prior presence of operational, consented and proposed developments, there would be a Major effect (significant), based primarily on Garleffan, Pencloe and Enoch Hill. The addition of Over Hill would augment the significant cumulative effects and increase the spread of turbines across discrete parts of the horizon.

10.67 Residents in Skares, Burnside, Bankglen, and Auchinleck would also experience significant cumulative effects based on the combined presence of all operational, consented and proposed developments. However, in each case the significant effects would primarily occur in relation to views of other proposed developments of Garleffan and/or Enoch Hill but not as a result of the additional effect of Over Hill to the situation. There would be views of Over Hill, but it would represent a relatively discreet feature, rather than the primary cause of the significant effect.

10.68 In addition, Over Hill would result in a significant level of effect in its own right in views from the dispersed residential dwelling at Upper Beoch. Considered in combination with (predominantly screened) views of the recently consented South Kyle, this would also lead to a significant cumulative effect.

Cumulative Effects on Road and Rail Users

10.69 As stated in the ES, Over Hill would contribute to significant sequential cumulative effects on the B741, along the localised section of the road where Over Hill would exert significant effects in its own right. The changes associated with the FEI layout and changed cumulative situation would not alter this assessment.

10.70 As stated in the ES, road users on the B7046, A70(T), A76(T) and railway line (parallel to A76) would also experience significant cumulative effects. However, in each case the significant effects would primarily occur in relation to views of other operational, consented and proposed development. There would be views of Over Hill, but it would represent a more discrete feature, rather than the primary cause of the significant effect. The changes associated with the FEI layout and changed cumulative situation would not alter this assessment.

Cumulative Effects on Recreational Receptors

10.70.1 As stated in the ES, Over Hill would contribute to significant, mainly sequential, cumulative effects on parts of the PRoW network but would not have any significant cumulative effects on any Long Distance Routes or National Cycle Ways.

10.70.2 Over Hill would result in a significant level of effect in its own right in open views from; the PRoW between the B741 and Burnston (via Rigg Hill); between the B741 and Little Rigend Hill; and between the B741 and Benty Cowan Hill, which are all located within 5 km. With the fully consented baseline (including South Kyle), the addition of Over Hill would lead to some significant cumulative effects for users of these routes. With the fully consented baseline and all other proposals, there would be some potentially significant cumulative effects on these routes in relation to Enoch Hill.

10.70.3 Over Hill would also result in a significant level of effect in its own right in open views from select sections of the PRoW/Core Paths within the wider area, including those 5.2-10 km to the east of the Proposed Development, as well as those between Ochiltree and Drongan (5.5-10 km to the north west). However, there would be no further significant cumulative effects with the fully consented baseline. There would be the potential of some potentially significant cumulative effects with other proposals including Enoch Hill and to some degree Pencloe.

10.70.4 As stated in the ES, users of New Cumnock Golf Club would also experience significant cumulative effects. However, these would primarily occur in relation to views of other operational, consented and proposed development. Where there would be views of Over Hill, it would represent a discrete feature in the distance, rather than the primary cause of the significant effect. No other significant cumulative effects as a result of Over Hill were identified at any other recreational or tourist destinations. The changes associated with the FEI layout and changed cumulative situation would not alter this assessment.

Summary

10.71 This section summarises the key landscape and visual effects based on the FEI Layout of the proposed Over Hill Wind Farm. The FEI Layout has been redesigned to reduce the potential effect on the sensitive bog habitats and comprises 10 turbines at 149.9 m to blade tip. The size of the turbine has remained consistent with the ES but one turbine has been removed and four moved to from the more sensitive part of the bog. Revision in the forestry felling and new habitat has been an integral part of the design process.

10.72 Following review of the design, the revised FEI layout has resulted in the repositioning of turbines away from the centre of the array to retain the sensitive bog habitats but has retained the strong design relationship of the array within its landscape character setting. Following a review of the viewpoint analysis, the visual composition of the FEI Layout, from most views still results in a broadly coherent and well-designed scheme. The turbines remain generally well-spaced and the original horizontal appearance of the array has been maintained from most views.

10.72.1 In terms of the guidance within the EALWCS, the Proposed Development would still be located within the Foothills with Forest and Opencast Mining (EA17a) LCT, which is described as being of medium sensitivity to 'large' scale turbines. Within such areas of medium sensitivity, the EALWCS states that '*some key landscape characteristics or aspects of visual amenity are sensitive but there is still some ability to accommodate development*'. At a more local level, the Proposed Development would still avoid the more visually prominent outer slopes and hills of LCT EA17a. It would remain located slightly to the east of centre of the LCT, within an area benefiting from containment by the surrounding landform and forestry. This containment would limit intervisibility with open cast mining operations within the surrounding locality, and reduce any potential exacerbation of clutter or fragmentation of these disturbed areas.

10.72.2 With reference to the Supplementary Guidance: Planning for Wind Energy (2017), the Proposed Development would be located within the only area of Medium landscape sensitivity for turbines >70 m to tip, which represents the lowest level of sensitivity identified within East Ayrshire. The Proposed Development Area is in accordance with the Council's

preference for a minimum separation distance of 2 km from any settlement as described in the Draft Supplementary Guidance (as well as SPP and the EALDP).

Construction and Decommissioning Effects

10.73 The revised proposal has included an increased amount of track (from 9,2km to 11.4km) of which 2.9km is existing on site and increased forestry felling for the purposes of bog restoration on site. Although these changes would affect the construction and decommissioning, the level of effect assessed within the ES on both landscape fabric and landscape character would remain at Moderate and not significant.

Summary of Landscape Effects

10.74 Although there were some changes on the landscape fabric of the Site, as a result of the FEI Layout comparted to the ES layout, on balance the level of effect on landscape fabric would remain Moderate/minor adverse and not significant. With regard to the direct effect on landscape character of the host landscape, Foothills with Forest and Opencast Mining (EA17a) LCT, the effect of the FEI proposal would remain at Moderate and significant, as reported in the ES.

10.75 The indirect effects of the FEI proposal on the adjacent Upland Basis (EA15), Southern Uplands with Forestry (EA20c) and East Ayrshire Southern Uplands (EA20a) LCTs would also remain at Moderate and significant within localised parts, extending out to 4-5km of Over Hill. However, the effects on landscape would not be significant for remaining parts of these areas, or for them as a whole and this has remained consistent with the ES.

10.76 There would be no change to the level of effect reported in the ES on the remaining landscapes within the study area, which was reported as not significant.

10.77 With regard to the designated landscapes, as stated in the ES, there would be some localised areas of potentially significant effects within parts of the East Ayrshire Sensitive Landscape Areas, however this did not translate to significant effects on these designations as a whole. The changes to the FEI layout would not change the levels of effect reported on these two areas. Nor would the FEI layout change the other levels of effect reported on other designated landscape, which were all considered not to be significant.

10.78 Overall, the level of landscape effects would be no greater as a result of the FEI Layout than that reported in the ES.

Summary of Visual Effects

10.79 There is relatively little settlement within 5-7km of the proposal. In terms of visual effects; there is one single dwelling located within 2 km of the Proposed Development. The effect on views from this dwelling would remain significant (views remain partially screened by forestry). There would be significant effects in views from the settlement of Ochiltree (7.7km to the north of the Proposed Development). No significant visual effects are predicted from any other settlement, but there would be moderate effects at New Cumnock (9.1km away) which would be Moderate but not significant.

10.80 As stated in the ES, significant visual effects for road users would be limited to localised sections of the B741 as it passes to the south of the Proposed Development, and the changes as a result of the FEI Layout would not alter this.

10.80.1 No significant visual effects are predicted for users of long distance footpaths or promoted cycle routes. From Public Rights of Way and Core Paths within the study area, significant visual effects may occur where unrestricted visibility towards the Proposed Development would be possible. This includes parts of the PRoW between the B741 and Burnston, the PRoW between the B741 and Little Rigend Hill, and the PRoW between the B741 and Benty Cowan Hill, which represent the only footpaths within 5 km of the Proposed Development. Significant effects would also be experienced from localised parts of the wider PRoW/Core Path network. This includes those located to the east of the Proposed Development (between the Proposed Development and New Cumnock), as well as those between Ochiltree and Drongan (to the north west). The Proposed Development would not result in significant effects upon any other recreational route / attraction. This represents no change from extent of significant effects reported in the ES.

10.81 Overall, the level of visual effects would be no greater as a result of the FEI Layout than that reported in the ES.

Summary of Cumulative Effects

10.81.1 Significant cumulative landscape effects in association with the operational and consented baseline would be limited to (ii) localised parts of the Southern Uplands with Forestry (EA20c) LCT and (iii) localised parts of the East Ayrshire Southern Uplands (EA20a) LCT, between Over Hill and South Kyle Wind Farms. However there would not be any significant cumulative effects the East Ayrshire Sensitive Landscape Areas.

10.81.2 Significant cumulative landscape effects in association with operational, consented and other proposed developments would be limited to (i) the Foothills with Forest and Open Cast Mining (EA17a) LCT; (ii) localised parts of the Southern Uplands with Forestry (EA20c) LCT, between Over Hill and Enoch Hill / South Kyle Wind Farms; and (iii) localised parts of the East Ayrshire Southern Uplands (EA20a) LCT, between Over Hill and Enoch Hill Wind Farm. There would also be significant effects on localised parts of the East Ayrshire Sensitive Landscape Area, including some localised coalescence of characterising effects of Over Hill with Enoch Hill in the vicinity of Peat Hill.

10.81.3 Significant cumulative visual effects for residents in association with the operational and consented baseline would be limited to parts of Ochiltree and the single dwelling at Upper Beoch.

10.81.4 Significant cumulative visual effects for residents in association with operational, consented and other proposed developments would be limited to parts of Ochiltree and the single dwelling at Upper Beoch. Residents in Skares, Burnside, Bankglen, Auchinleck, and New Cumnock would also experience significant cumulative effects, although these would primarily occur in relation to views of other developments.

10.81.5 Significant sequential cumulative visual effects would be experienced by road users on parts of the B741.

10.82 Significant cumulative visual effects with the fully consented baseline would be experienced by walkers on the PRoW and Core Path network, including the PRoW between the B741 and Burnston; between the B741 and Little Rigend Hill; between the B741 and Benty Cowan Hill. Significant cumulative effects would also occur on these routes in combination with the proposal of Enoch Hill.

10.83 There would also be the potential for some further significant cumulative effects on sections of the PRoW/Core Paths the east of the Proposed Development (and west of New Cumnock), as well as those between Ochiltree and Drongan with Enoch Hill and to a lesser degree Pencloe.

10.84 Overall, the level of cumulative effects would be no greater as a result of the FEI Layout than that reported in the ES. However there have been some changes in the potential cumulative interactions due to changes in the status of other sites, which have led to further cumulative effects identified with the fully consented baseline.

Over Hill Wind Farm

FURTHER ENVIRONMENTAL INFORMATION
CHAPTER 11: TRAFFIC AND TRANSPORTATION

March 2018

11 TRAFFIC AND TRANSPORTATION

Introduction

11.1 This chapter forms part of the further environmental information (FEI) submission to the original Environmental Statement (ES) (now referred to as an "EIA Report" as of May 2017) prepared for the proposed Over Hill Wind Farm in East Ayrshire (hereafter referred to as the "Proposed Development").

11.2 The purpose of the original chapter was to assess the likely effects of the Proposed Development on the existing transport network and sensitive receptors as a result of the construction, operation and decommissioning phases. This FEI Traffic and Transport chapter presents what was reported in the original chapter whilst providing updated information where applicable to take account of changes to the windfarm design.

11.3 The key objectives of the chapter are to:

- Describe the assessment methodology and significance criteria used in completing the assessment;
- Describe the current traffic and transport conditions;
- Identify and assess the likely environmental effects associated with increased traffic;
- Identify and describe the mitigation measures proposed to address any significant effects;
- Identify and assess any likely cumulative effects; and
- Assess any residual effects post mitigation implementation.

11.4 This chapter has been prepared by SYSTRA Ltd and is supported by Figures 11.1 and 11.2 which are referenced in the text and the original Technical Appendix 11.1: Abnormal Loads Assessment (also prepared by SYSTRA and submitted with the original ES Chapter in May 2017).

Legislation and Policy Context

11.5 This chapter has been prepared taking cognisance of the Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (EIA Regulations). The following data sources and guidelines have been used to inform this assessment.

- Scottish Planning Policy (SPP) Paragraphs 165 – 181;
- Planning Advice Notice (PAN) 75 – 'Planning for Transport';
- Institute of Highways and Transportation (IHT) publications - "Guidelines for Traffic Impact Assessment", 1998;
- Institute of Environmental Management Assessment (IEMA formally IEA) publication – "Guidelines for the Environmental Assessment of Road Traffic", 1993;
- Department for Transport (DfT) publication – "Design Manual for Roads and Bridges" (DMRB); and

- DfT 2015 Average Annual Daily Traffic (AADT) flows for 4 locations.

Stakeholder Consultation

11.6 As part of the original Traffic and Transport ES Chapter, consultation was undertaken with East Ayrshire Council (EAC), Ayrshire Roads Alliance (ARA) and with Transport Scotland (TS) in relation to the trunk road network (A76). The consultation responses are summarised by Table 11.1.

Table 11.1: Consultation Responses

Consultee	Issue Raised / Comment	Response / Action Taken
East Ayrshire Council (EAC)	1. ES should take account of cumulative construction traffic projects, particularly on B741 and A76. 2. Investigate option of using on-site borrow pits to reduce traffic movements. 3. ES should include an outline TMP as a technical appendix. 4. ES should identify potential sources of materials and consider the impact on those routes. 5. Details of the site access and visibility sightlines should be included in the ES.	1. A cumulative assessment is undertaken within this chapter. 2. This is under investigation but to provide a worst-case scenario it is assumed that 100% of stone requirements are imported. 3. Noted. 4. Noted - potential routes are identified and assessed within this chapter. 5. A site access design inclusive of visibility splays and swept path analysis has been prepared.
Community Council	Evidence of consideration of cumulative traffic impact with other wind farm developments and traffic impacts with construction of the electricity infrastructure network.	A cumulative assessment is undertaken within this chapter.
Transport Scotland	No longer require to be consulted on EIAs under new legislation but approval will be required for the movement of any abnormal loads via the trunk road network post consent.	Noted – An Abnormal Loads Assessment is included as a Technical Appendix to the chapter.

Scope of Assessment

11.7 The assessment is made with reference to the Proposed Development, as described in Chapter 3: Project Description and Construction Methods.

11.8 The most identifiable traffic and transport characteristic associated with wind farm developments is the need to transport abnormal loads to site. The majority of wind turbine components would be transported as an abnormal load from the selected Port of Entry. Initial assessment has identified the likely Port of Entry (PoE) for the turbines as the Port of Ayr and a preferred route to the site via the A77 and A76 trunk roads. The vehicles would travel on the A76 south eastwards to New Cumnock and then route onto the B741 heading south-west to the site access. Abnormal loads may require a police escort and will likely restrict traffic along the route for a short duration of time. A full Abnormal Loads Assessment has been undertaken

for the route which identifies a number of pinch points on the proposed route to site. A swept path analysis has been undertaken at pinch points where there is potential for the load to over-run or over-sail beyond the normal carriageway boundaries. The Abnormal Loads Assessment can be found within Technical Appendix 11.1 and it contains a number of proposed mitigation measures on the route to site.

11.9 There is also a need to bring general construction materials (concrete, aggregates, pipes, cabling, etc.) in standard HGVs to the Proposed Development. The characteristic of this form of traffic is a temporary intensification of HGV traffic on the road network. This intensification varies depending on the scale of the development and the construction stage requirements. The distribution of construction traffic is unknown at this stage as the origin of materials and labour have not yet been determined, therefore, robust worst-case scenarios have been adopted in terms of distribution for any traffic impact.

11.10 The routes for general construction HGVs have been identified as:

- From the A713 onto Gateside Road in Dalmellington (to avoid the village centre) and then onto the B741 routing north-east to the site access; and
- From the A76 (T) through New Cumnock and onto the B741 routing south-west to the site access (i.e. following the latter part of the abnormal loads route).

11.11 The impact of increased traffic associated with the Proposed Development on existing access tracks is not anticipated to have a discernible environmental effect and is therefore not assessed in this Chapter. The impact and effects of the Proposed Development on the Local Road network and strategic trunk road network (A76) are however assessed.

11.12 A small amount of traffic would also be generated by construction workers commuting to / from the Proposed Development during the construction and operational stages.

11.13 A cumulative assessment in respect of the traffic and transport effects has been undertaken for other developments within the surrounding area that would potentially utilise the same road network as the proposed development during the construction period.

11.14 It is recognised that the construction period represents the greatest intensification in traffic although it is important to note that this intensification is temporary in nature. The parameters and assumptions used to inform this chapter have been designed to represent a robust (worst-case) scenario, where practical.

Potential Effects Scoped Out

11.15 On the basis of a site visit, a comprehensive desktop study, the professional judgement of the EIA Team with experience from other relevant projects and policy guidance, the following characteristics have been scoped out of this Traffic and Transport chapter;

- Environmental assessment of traffic associated with the operational stage;
  - Once the Proposed Development is operational, the amount of traffic associated with a wind farm is minimal, relating to maintenance of wind turbines only. Vehicles used for maintenance are likely to be road going 4x4s. There may, on rare occasions be the need for HGV access to the wind turbines. It is estimated that on average

there would be two 4x4s accessing the site on a monthly basis and one HGV every 3 months. It is considered that the traffic impact and associated environmental effects of vehicle movements during the operational phase would be negligible. In respect of traffic and transport the operational phase of the Proposed Development is therefore not assessed in this Chapter.

11.16 Environmental assessment of traffic associated with the decommissioning stage;

- Planning permission for the Proposed Development is sought for a 25 year period, after which the Proposed Development would be decommissioned unless a further application is submitted for an operational extension. Traffic associated with the decommissioning stage is anticipated to be significantly less than that generated during construction. A contributing factor to this is that the majority of the access tracks and hardstanding areas will likely remain in-situ and will therefore not generate any HGV movements. However, even if this was not the case and that all access tracks and hardstanding areas were to be reinstated to their current form, the level of traffic would continue to be less than the construction stage given that the construction stage includes various other activities that generate HGV movements such as forestry removal and site establishment. Given the timescales involved and the likelihood for changes to the baseline situation during this period, the traffic and transport impacts and effects of wind farm decommissioning are not assessed in this Chapter;

- The effect of construction related vehicles on the road network, in respect of traffic flows, both in isolation and cumulatively, is considered unlikely to be significant in terms of peak hour congestion. Therefore full detailed junction capacity assessments have not been undertaken; and
- It is anticipated that the volume of traffic associated with the construction of the Proposed Development would not have a discernible effect on roads and sensitive receptors out-with the study area (see below for definition of the study area) as the effects of traffic are diluted with increasing distance from the point of origin.

Assessment Methodology & Significance Criteria

Baseline Characterisation

Study Area

11.17 The study area for the assessment of traffic and transport has been predicated on the proposed access location to the site and the proposed road routes to the access point via the external road network. To determine appropriate access routes to the site, detailed consideration and assessment of the surrounding road network has been undertaken. A comprehensive desk based study and a site visit was undertaken to fully understand the surrounding road network.

11.18 The study area has been identified using the assessment thresholds within the IEMA Guidelines as an aide and is indicated by Figure 11.1. The study area is as follows:

- The A76 (T) (in the vicinity of New Cumnock);

- The B741 link between New Cumnock and Dalmellington;
- Gateside Road in Dalmellington; and
- The A713 (in the vicinity of Dalmellington).

Desk Based Research and Data Sources

11.19 The traffic and transport study area characteristics have been determined by a desk based assessment utilising publically available Annual Average Daily Flow (AADF) data from the DfT Website[1] and data from an Automatic Traffic Count (ATC) commissioned for the purpose of this assessment. Described below is the source of the traffic count information at each of the road links within the study area. These are also indicated by Figure 11.2.

(1) – 24 hour ATC survey undertaken for South Kyle Wind Farm;
(2) – 24 hour ATC survey undertaken 1st February – 7th March 2017;
(3) – DfT AADF counter ID number 241750;
(4) – DfT AADF counter ID number 249300;
(5) – DfT AADF counter ID number 260000; and
(6) – DfT AADF counter ID number 30887.

11.20 Traffic flow data sourced from the DfT is available for the period from 2000 to 2016 while the ATC survey for South Kyle Wind Farm was collected in 2013. The growth trend for the DfT data has been reviewed over a ten year period and is reflective of the NRTF (National Roads Traffic Forecast) low growth factor. For the purposes of this assessment, an NRTF low growth factor has been applied to the traffic flows at all locations to create a baseline scenario that is representative of the current year. The data has been updated in this FEI chapter to reflect traffic flows for 2018 as the original chapter was prepared in 2017.

Assessment of Effects

11.21 The assessment of effects is based on the project description as outlined in Chapter 3: Project Description.

11.22 This assessment is structured around the consideration of potential environmental effects relating to traffic and transport, as identified by the IEMA Guidelines and including the following:

- Visual impact;
- Noise
- Severance;
- Driver delay;
- Pedestrian delay;
- Pedestrian amenity;
- Accidents and safety
- Hazardous loads; and

[1] www.dft.gov.uk/traffic-counts/ (accessed March 2018)

- Dust and dirt.

11.23 The environmental effects associated with visual impact and noise are addressed in Chapter 10: Landscape and Visual and Chapter 7: Noise. No hazardous loads are associated with the Proposed Development.

11.24 Guidance for the assessment of the environmental effects of traffic is provided in the IEMA document, "Guidelines for the Environmental Assessment of Road Traffic. The document is the only guidance document currently available that sets out a methodology for assessing potentially significant environmental effects where a Proposed Development is likely to give rise to changes in traffic flows.

11.25 The guidance suggests that in order to determine the scale and extent of the assessment and the level of impact the development will have on the surrounding road network, the following two 'rules' should be followed:

- Rule 1 – Include highway links where flows are predicted to increase by more than 30% (10% if affecting a sensitive area) or where the number of heavy goods vehicles (HGVs) is predicted to increase by more than 30%; and
- Rule 2 – Include any other specifically sensitive area where traffic flows are predicted to increase by 10% or more.

11.26 It is considered that both rules from the IEMA Guidelines are appropriate to apply when assessing the potential effects of the Proposed Development on the road network. These rules are used to identify the road links within the study area where a full assessment of environmental effects associated with an intensification in road traffic may be required.

11.27 New Cumnock is considered to be a sensitive receptor in this assessment as the A76 (T) routes through the Village Centre, therefore Rule 1 is applied here. While Dalmellington is also a sensitive receptor, the construction traffic route via Gateside Road has been specifically designated as it routes around the more residential periphery of Dalmellington, avoiding cutting through the centre. Therefore, Rule 2 is applied here. It is noted that the A713 and Gateside Road will not be used by abnormal load vehicles.

Assessment of Significance

11.28 The magnitude of the environmental effects associated with traffic and transport and the significance of any effects are assessed in this Chapter. The sensitivity to change in traffic levels of any given road segment or junction is generally assessed by considering the residual capacity of the network under existing conditions. Where there is a high degree of residual capacity, the network may readily accept and absorb an increase in traffic and therefore the sensitivity may be said to be low. Conversely, where the existing traffic levels are high compared to the road capacity, there is little spare capacity and the sensitivity to any change in traffic levels would be considered high.

11.29 The magnitude of traffic impacts is a function of the existing traffic volumes, the percentage increase and change due to a development, the changes in type of traffic, and the temporal distribution of traffic (day of the week, time of day). The determination of magnitude has been undertaken by reviewing the Proposed Development, establishing parameters of the

road that may be affected and quantifying these effects utilising IEA Guidelines and professional judgement.

11.30 Consideration has been given to the composition of the traffic on the road network, under both existing and proposed conditions. For example, LGVs have less effect on traffic and the road system than HGVs. Similarly, HGVs can have less effect than abnormal load vehicles depending on the frequency of the abnormal loads.

11.31 The criteria that has been used to make judgements on the importance / sensitivity of the receptor(s) and the magnitude of change are presented in Table 11.2 and Table 11.3 respectively.

Table 11.2: Receptor Sensitivity

Sensitivity	Description
High	People whose livelihood depends upon unrestricted movement within their environment; this includes commercial drivers and the companies who employ them. Local residents whose daily activities depend upon unrestricted movement within their environment. Receptors such as schools, colleges and accident hotspots.
Medium	People who pass through or habitually use the area but whose livelihood is not wholly dependent on free access. Receptors such as congested junctions, hospitals, cemeteries and conservation areas.
Low	Occasional users of the road network. Receptors such as public open space and residential areas. Areas with trunk road or A class roads constructed to accommodate significant HGV volumes.
Negligible	Users not sensitive to transport effects. Includes very small settlements and roads with no significant settlements including new strategic trunk roads or motorways.

Table 11.3: Magnitude of Change

Magnitude	Description
Substantial	The proposals could result in a significant change in terms of length and / or duration to the present traffic routes or schedules or activities, which may result in hardship.
Moderate	The proposals could result in changes to the existing traffic routes or activities such that some delays or rescheduling could be required, which cause inconvenience.
Slight	The proposals could occasionally cause a minor modification to routes, or a very slight delay in present schedules, or on activities in the short term.
Negligible	No effect on movement of road traffic above normal level.

11.32 As a guide to inform the assessment, but not as a substitute for professional judgement, criteria for determining the significance of traffic related effects are set out in the matrix in Table 11.4. This is based on combining the magnitude of the effect with the receptor sensitivity.

Table 11.4: Matrix of Significance

Sensitivity	Magnitude of Change				
		Substantial	Moderate	Slight	Negligible
	High	Major	Major / Moderate	Moderate	Moderate / Minor
	Medium	Major / Moderate	Moderate	Moderate / Minor	Minor
	Low	Moderate	Moderate / Minor	Minor	Minor / Negligible
	Negligible	Minor	Minor / Negligible	Negligible	None

11.33 Significance is categorised as major, moderate, minor, negligible or none. Effects judged to be of major or moderate significance are considered to be **Significant** in accordance with the EIA Regulations. Effects judged to be of minor, slight or negligible significance are considered **Not Significant**.

Baseline Conditions

11.34 The following paragraphs detail the baseline conditions of the road links identified as being within the study area.

A76 (T)

11.35 The A76 forms part of the strategic trunk road network and runs south eastbound from Kilmarnock (Bellfield Roundabout) to Dumfries (Cuckoo Bridge Roundabout) for approximately 90 km. The A76 (T) is a single carriageway road with a varying speed limit ranging from 30 mph through settlements up to the National Speed Limit in more rural locations of 60 mph.

11.36 Through New Cumnock, the A76 (T) has footways on both sides of the road and street lighting. There are also signalised pedestrian crossings and pedestrian refuge islands at various points along the road within New Cumnock.

11.37 The A76 (T) is proposed for use by abnormal load vehicles routing from the PoE (likely to be the Port of Ayr) to the site via the B741. It is anticipated that a proportion of the general construction HGV traffic will also use the A76 (T) to route from the wider road network onto the B741 and site access.

A713

11.38 The A713 is a single carriageway road running in a south easterly direction between Ayr and Castle Douglas for approximately 80 km, roughly parallel to the A76 (T). The A713 passes to the south-west of Dalmellington and has footways on both sides of the road through the village and street lighting.

11.39 Generally the A713 is subject to the National Speed Limit (60mph) with a 30mph limit through settlements such as Dalmellington. Additionally along the A713 Ayr Road through Dalmellington, there are traffic calming measures in the form of speed cushions.

11.40 The A713 will be used by general construction HGVs to reach Gateside Road and the B741 from the wider road network. Abnormal load vehicles will not use the A713.

B741

11.41 The B741 is a single carriageway road which runs between Girvan and New Cumnock (approximately 50 km). The B741 has footways on at least one side of the road and street lighting through Dalmellington and (leaving) New Cumnock where there are a number of properties with direct frontage onto the road. Outwith these areas, the road is rural in nature with grass verges either side of the road.

11.42 The B741 is predominantly subject to the National Speed Limit (60mph) with a 30mph limit in the settlement areas. The section of the B741 between Dalmellington and New Cumnock only is within the study area, required for use by all construction related traffic. General construction HGVs will approach the site access along the B741 from either the south-west or north-east. Abnormal loads will approach the site along the B741 from the north-east only.

Gateside Road

11.43 Gateside Road is a good standard single carriageway road which runs between the A713 Ayr Road and the B741, routing around the northern edge of Dalmellington. It is subject to a 30mph speed limit. There is a row of properties along a stretch of the road (approximately 530m long) with direct frontage onto Gateside Road.

11.44 Gateside Road has a footway on at least one side of the road at all points (predominantly the southern side of the road) and street lighting. It is noted that a section of the footway is separated from the carriageway by a grass verge and fence, and that a small street called Broomknowe runs parallel to Gateside Road (behind the properties), which is mainly a residential street used to access the properties set back from Gateside Road.

11.45 Gateside Road is proposed for use by general construction HGVs providing a link between the A713 and the B741 to the site access. No abnormal loads will require the use of Gateside Road.

Access Track

11.46 There is an existing track which forms a priority junction with the B741 approximately 800m to the north-east of the electrical substation which is proposed for use by all traffic associated with the Proposed Development. The existing access from the B741 will require upgrading and a site access design has been undertaken to indicate the necessary work required, swept path analysis for abnormal loads and the visibility splays that can be achieved.

11.47 There is a network of existing tracks which have been used for opencast mining activities adjacent to the site and these are conducive to the movement of HGVs. Some sections of new track will be required to access each turbine location.

Baseline Traffic Flows

11.48 Table 11.5 indicates the two-way Average Annual Daily Traffic Flow (AADF) in the study area and the percentage of traffic which is classified as HGVs. The source of the data is described in Paragraph 11.18 and has been updated as part of this FEI chapter to reflect 2018 traffic flows (original chapter presented 2017 traffic flows). The table below also indicates the capacity of each road link as per the guidance contained within the DMRB[2].

Table 11.5: Study Area Baseline Traffic Flows

Counter Location	Capacity (two-way per day)	AADF	HGV	Percentage HGV
1. B741 at the site access	43,200	519	17	3%
2. Gateside Road (in Dalmellington)	38,400	816	24	3%
3. A713 at Patna	57,600	3,804	215	6%
4. A713 south-east of Dalmellington	57,600	1,598	168	11%
5. A76 north-west of New Cumnock	57,600	6,645	944	14%
6. A76 east of New Cumnock	57,600	2,872	535	18%

Road Safety

11.49 The Crash Map website[3] has been utilised to determine the number of accidents that have occurred in the previous five years (2013 – 2017) within the study area, approximately 3km in each direction from the Counter Locations. The definition of the levels of severity are as follows:

- Slight – minor injury treated at the scene;
- Serious – injury for which the person is detained in hospital; and
- Fatal – the person dies within 30 days of the accident.

11.50 The results of this investigation are indicated by Table 11.6 with additional commentary provided on serious or fatal accidents.

[2] DMRB (2013) Economic Assessment of Roads Schemes in Scotland, Volume 15, Section 1: The NESA Manual

[3] www.crashmap.co.uk (accessed March 2017)

Table 11.6: Accident Statistics

Counter Location	Slight	Serious	Fatal	Comment
1. B741 at the site access	2	2	-	A serious accident occurred in 2015 and another in 2017 at a right-hand bend approximately 3km (crow flies) to the north-east of the site access.
2. Gateside Road (in Dalmellington)	1	-	-	-
3. A713 at Patna	10	2	-	A serious accident occurred at the properties along the west side of the A713 north of Patna in 2014. Another serious accident occurred in 2015 at the junction between Jellieston Terrace and Dalharco Avenue.
4. A713 south-east of Dalmellington	8	1	-	One serious accident in 2014 on the A713 at Kirn Bridge.
5. A76 north-west of New Cumnock	9	1	-	One serious accident occurred near the access to Lochhill Farm in 2017.
6. A76 east of New Cumnock	4	1	-	A serious accident occurred in 2015 on the A76 approximately 1km east of New Cumnock
Total	**34**	**7**	**-**	-

11.51 Table 11.6 indicates that between 2013 and 2017 there were 34 slight, 7 serious and no fatal accident within the area of influence.

The 'Do Nothing' Scenario

11.52 If the Proposed Development was not implemented then it is likely that there would be no significant changes to the traffic and transport situation in the vicinity of the Proposed Development, other than changes to background traffic as a result of general growth.

Identification and the Evaluation of Key Impacts

Construction Programme

11.53 The construction traffic associated with the Proposed Development would comprise of construction workers, HGVs / LGVs carrying construction materials and plant, and abnormal load vehicles carrying the main wind turbine components.

11.54 There is expected to be between 15 and 20 personnel working on site at any one time. It is important to note that the number of personnel on site would vary during the construction process. In general, working hours are expected to be between 07:00 to 19:00 on weekdays and 07:00 to 13:00 on Saturdays which means that staff would generally arrive and depart outside the peak hours associated with the surrounding road network (typically 08:00 to 09:00 and 17:00 to 18:00). Turbine delivery, erection and commissioning activities may take place out-with these hours depending on weather conditions.

11.55 Estimates of traffic generation associated with the construction phase of the Proposed Development have been calculated from first principles and consider the following activities:

- Delivery and removal of plant / materials in relation to site mobilisation and set up of site compound;
- Delivery of aggregates and geotextile materials to construct site access roads;
- Delivery of wearing course for access roads and hardstanding areas at the site;
- Delivery of concrete or raw materials to batch concrete on site;
- Delivery of steel reinforcement and base rings for turbines;
- Delivery of transformers and switchroom equipment;
- Delivery of sand bedding for cabling;
- Delivery of cabling for turbines;
- Delivery of turbine components and cranes for erection (including abnormal loads);
- Miscellaneous deliveries; and
- Construction worker travel movements.

11.56 In order to calculate a robust scenario, information was gathered regarding the materials required and the size of average loads associated with the construction vehicles. Table 11.7 includes an estimate of vehicle numbers required for each task during the construction period which has been updated since the preparation of the original Traffic and Transport ES Chapter in 2017. The key changes include a revised number of loads associated with forestry removal and importation of stone associated with an increased access track length.

Table 11.7: Estimated No. of HGV Trips during Construction

Construction Task	Vehicle Type	Approximate No. of Loads
Site Establishment	Dump truck	110
General site deliveries	Dump truck	136
Forestry removal	Articulated Low Loader	200
Imported stone*	Dump truck	3,717
Reinforcement	Dump truck	25
Foundations (off-site batched concrete)	Concrete wagon & arctic trailer	1,145
Cabling deliveries and sand	Low loader	376
Geotextile separators	Low loader	138
Delivery of HV electrical items	Dump truck	27
Cranes and related lifting equipment	Crane vehicle	33
Erection of turbines	Abnormal loads	117
Site reinstatement and restoration	Various	55
	Total (one-way trips)	6,017
	Total (two-way trips)	12,034

**assumes 45% of stone requirements are imported to the site*

11.57 For the purposes of this updated assessment, it is assumed that 45% of the stone requirement would be sourced off-site. This represents a robust case as is likely that a large proportion of the required stone can be sourced from on-site borrow pits (estimated at 73% of the total requirement) and it is the developer's intention to win stone in this manner. This would reduce the number of HGV movements associated with this stage of construction. However, this would have no bearing on the environmental assessment given that it has been assumed that 45% of the required stone would be sourced from off-site in the calculations.

11.58 In addition to the construction vehicles identified in Table 11.7, it is anticipated that there would be approximately 40 two-way daily private car / LGV trips to the Proposed Development associated with construction staff and welfare. This equates to a maximum of just 20 arrivals and 20 departures at the start and end of the working day. In these circumstances, the effects of car / LGV traffic have been considered to be negligible and have not been assessed further.

11.59 It is anticipated that the abnormal loads will require car or LGV escort vehicles while transporting the turbines. This would equate to approximately 4 vehicles per day when transporting the abnormal loads. This impact is also considered to be negligible and has not been assessed further.

11.60 The construction of the Proposed Development would take approximately 13 months. Using the indicative construction programme, the number of construction trips that are anticipated to visit the site for each month of the construction period has been calculated as illustrated by Table 11.8. This has been based on a 13 month construction period to provide a worst-case scenario in terms of the intensification of traffic. For the purposes of this assessment, it is assumed that all vehicles associated with the construction of the Proposed Development are HGVs or abnormal load vehicles, thus providing a robust assessment as a proportion of these trips will be LGVs. This table has been updated as part of this FEI Chapter to account for changes in the number of loads associated with forestry removal and imported stone. Furthermore, the construction programme has been extended by one month since the preparation of the original Traffic and Transport ES Chapter in May 2017.

Table 11.8: Estimated No. of HGV Trips per Month

Task	Month													Totals
	1	2	3	4	5	6	7	8	9	10	11	12	13	
Site Establishment	55	55												110
General site deliveries	9	9	9	9	9	9	9	14	18	18	14	5	4	136
Forestry removal	77	77	46											200
Imported stone*	602	602	688	688	688	449								3,717
Reinforcement						5	5	5	5	5				25
Foundations (off-site batched concrete)						229	229	229	229	229				1,145
Cabling deliveries and sand								94	94	94	94			376
Geotextile separators						46	46	46						138
Delivery of HV electrical items										9	9	9		27
Cranes and related lifting equipment								11	11	11				33
Erection of turbines									39	39	39			117
Site reinstatement and restoration													55	55
Total (one-way trips)	**743**	**743**	**743**	**697**	**697**	**738**	**289**	**399**	**396**	**405**	**156**	**14**	**59**	**6,079**
Total (two-way trips)	**1,486**	**1,486**	**1,486**	**1,394**	**1,394**	**1,476**	**578**	**798**	**792**	**810**	**312**	**28**	**118**	**12,158**

**assumes 45% of stone requirements are imported to the site*

11.61 The construction site may be operational up to 12 hours every weekday (07:00 – 19:00) and up to 6 hours on a Saturday (07:00 – 13:00) which equates to a 5.5 day working week. A condition may be applied to the Proposed Development if consented which restricts construction working hours at certain times of day, however vehicles could be arriving and departing the site at regular intervals during expected site working hours.

11.62 Table 11.8 indicates that the HGV trips are relatively well spread out over the duration of the construction period. Months 1 – 6 have the highest number of trips associated with the importation of stone for the construction of the site access track network, with Months 1, 2 and 3 having the highest number of trips overall. The last three months are relatively light in terms of HGV trips when compared with the months when stone / concrete is imported.

11.63 With regard to the movement of abnormal load vehicles, Table 11.8 indicates that abnormal loads will only be transported over 3 months of the 13 month construction period. It is also noted that no transportation of abnormal loads occurs during the worst-case month. Assuming 78 two-way abnormal load vehicle trips per month, this equates to approximately 20 two-way trips per week. Abnormal load vehicles are restricted in the hours that they can transport turbine components. Considering these restrictions, approximately 4 abnormal loads would be transported per day, equating to 1 per hour. Furthermore, abnormal load vehicles will retract to the size of an HGV for their return journey once the load has been delivered to the destination. Given this low number of vehicles and the short duration for which abnormal load vehicles will be on the local road network, it is not anticipated that this number of abnormal load vehicles will give rise to any significant environmental effects. As a result, no further assessment of the effect of abnormal load vehicles has been undertaken.

11.64 The worst-case months for general construction traffic (HGVs) are Month 1, 2 and Month 3 with 1,486 two-way HGV trips estimated. Assuming four weeks per month, this equates to approximately 372 two-way HGV trips per week (186 inbound and 186 outbound). The HGV trips associated with Months 1, 2 and 3 are therefore used to assess the traffic impact and associated environmental effects of the Proposed Development on the transport network and adjacent receptors. This estimate of HGV movements assumes that 45% of the stone requirement is imported; however, it is likely that a large proportion of the required stone could be sourced on-site (estimated to be 73% of the total requirement) which would significantly reduce the number of HGV movements. It is therefore considered that the traffic levels assessed are worst-case, therefore providing a robust assessment.

11.65 The daily vehicle trip generation for Months 1, 2 and 3 is therefore estimated to be approximately 68 two-way trips (assuming 5.5 days per week). This equates to approximately 6 two-way HGV trips per hour (3 inbound and 3 outbound), assuming a 12 hour working day. It is important to note that this represents a minor number of trips over a temporary period.

Construction Effects

11.66 In order to assess the impact of construction traffic, it is necessary to determine the distribution of generated trips.

11.67 As the origin of construction materials has not yet been identified, the following two scenarios have been assessed:

- 70% of HGVs route from the A713, through Dalmellington and onto the B741 to the site access; and
- 70% of HGVs route from the A76 (T) through New Cumnock and onto the B741 to the site access.

11.68 The above scenarios are effectively theoretical as you cannot have 70% of traffic coming from both directions but the purpose of the assessment is to look at the worst case scenario on each affected road link.

11.69 Table 11.9 below indicates the proportion of HGV trips that have been distributed over each counter location within the study area during the peak month.

Table 11.9: Construction Traffic Distribution

Counter Location	% Distribution	No. of daily two-way trips
1. B741 at the site access	100%	68
2. Gateside Road	70%	48
3. A713 at Patna	70%	48
4. A713 south-east of Dalmellington	70%	48
5. A76 (T) north-west of New Cumnock	70%	48
6. A76 (T) east of New Cumnock	70%	48

11.70 Table 11.10 details the daily percentage increases associated with the construction of the Proposed Development at traffic counters within the study area during the worst-case month. Counter locations are illustrated in Figure 11.3.

Table 11.10: Construction Traffic Impacts on Routes within Study Area

	Location 1	Location 2	Location 3	Location 4	Location 5	Location 6
Existing AADF	519	816	3,804	1,598	6,645	2,872
Existing HGV Count	17	24	215	168	944	535
Existing HGV %	3%	3%	6%	11%	14%	18%
Month 1 / 3 – worst-case Daily Traffic Flow	68	48	48	48	48	48
Existing AADF + Month 1 / 3 – worst-case Traffic	587	864	3,852	1,646	6,693	2,920
Existing HGV Count + Month 1 / 3 Count	85	72	263	216	992	583
Percentage increase in total traffic due to the Proposed Development	13%	6%	1%	3%	1%	2%
Percentage increase in HGVs due to the Proposed Development	400%	200%	22%	29%	5%	9%

11.71 Table 11.10 indicates that the increase in HGVs associated with the Proposed Development at Location 1 exceeds the 30% traffic increase threshold as stated in the IEMA guidelines triggering the need for a detailed assessment of impact. Within Dalmellington, the HGV increase of 200% also confirms that a full assessment of environmental effects is required for Location 2 at Gateside Road. It is noted that the percentage increase in total traffic due to the Proposed Development along these road links is considerably lower than the increase in HGVs at 13% and 6% at Locations 1 and 2 respectively.

11.72 Along the A713, the HGV impact is anticipated to be 22% and 29% at Locations 3 and 4 respectively during the worst-case month, as indicated by Table 11.10. The increase in total traffic is negligible at 1% and 3% at Locations 3 and 4 respectively. As the HGV and total traffic increase is less than 30%, it can be concluded that the impact on the A713 is negligible and not assessed further in this chapter.

11.73 Table 11.10 demonstrates that HGV levels could increase by 5% and 9% along the A76 (T) to the north-west and east of New Cumnock respectively during the construction stage of the Proposed Development. The increase in total traffic along the A76 (T) is expected to be 1 – 2% during the peak traffic generation month. As a result, the impact is considered to be negligible and does not require further assessment as per IEMA guidance.

11.74 The environmental effects identified in the IEMA guidelines are addressed in the following paragraphs for Location 1 (the B741) and Location 2 (Gateside Road in Dalmellington).

Severance

11.75 The IEMA Guidelines advise that "Severance is the perceived division that can occur within a community when it becomes separated by a major traffic artery".

11.76 The potential for traffic associated with the Proposed Development to cause severance is assessed on a case by case basis using professional judgement where non negligible traffic increases are predicted on roads through residential settlements.

11.77 Increased severance can result in the isolation of areas of a settlement or individual properties. Severance may result from the difficulty of crossing a heavily trafficked road or a physical barrier created by the road itself. Severance effects could equally be applied to residents, motorists or pedestrians.

11.78 The IEMA Guidelines state the following indicators to determine the magnitude of severance:

- Changes in traffic flows of below 30% are regarded as "negligible";
- Changes in traffic flows of 30% - 60% are regarded as "slight";
- Changes in traffic flows of 60% - 90% are regarded as "moderate"; and
- Changes in traffic flows above 90% are regarded as "substantial".

Location 1(B741)

11.79 With reference to the indicators above, the magnitude of change in HGV traffic at Location 1 is considered to be substantial as the increase in HGVs exceeds 90% of the existing HGV flows. The sensitivity of Location 1 to changes in HGV levels is considered to be negligible for severance as there are no settlements, and for the most part very few isolated properties, along the B741. When combined in accordance with Table 11.4, it can be concluded that there will be a slight severance effect at Location 1 which is considered to be **Not Significant** in accordance with the EIA regulations.

Location 2 (Gateside Road)

11.80 With reference to the indicators in Paragraph 11.75, the magnitude of change in HGV traffic through Dalmellington is considered to be substantial as it exceeds a 90% change. The sensitivity of Gateside Road is considered to be low given that it is a residential area, although, it should be noted that the use of Gateside Road by construction traffic to route from the A713 to the B741 is due to this road link being less sensitive than the Main Street which runs through the centre of Dalmellington. Gateside Road avoids the centre of Dalmellington where the local amenities are concentrated and is the preferred route for traffic travelling between the A713 and the B741. A substantial magnitude combined with a low sensitivity would result in a moderate and significant impact as per the significance matrix in Table 11.2. However, when considering that as a worst-case 48 HGVs per day routing through Location 2 equates to only 4 HGVs per hour, it is considered (based on professional judgement) that the effect is minor rather than moderate and therefore **Not Significant** in accordance with the EIA regulations.

Driver Delay

11.81 Some driver delay may be experienced when construction traffic is accessing the site. The IEMA Guidelines advise "delays are only likely to be significant when the traffic on the network surrounding the development is already at, or close to, the capacity of the system".

11.82 Traffic delay to non-development traffic can occur at several points on the network surrounding the development site including:

- At the development entrance where there will be additional turning movements;
- At intersections along the local road network which might be affected by increased traffic; and
- At side roads where the ability to find gaps in traffic may be reduced, thereby lengthening delays.

11.83 It is noted that there are no existing significant areas of congestion within the study area.

Location 1 (B741)

11.84 Although the percentage increase in HGVs is large (400%), it is noted that this is due to the fact that the B741 is very lightly trafficked with regard to existing HGV levels (24 per day). Assuming that the Proposed Development will generate 68 two-way HGV trips daily through Location 1 in the peak traffic generating month, this would equate to approximately 6 HGV trips per hour (3 inbound and 3 outbound). By comparing the actual level of HGV trips and the descriptions indicated by Table 11.3, the magnitude of change is considered to be slight. The sensitivity of Location 1 is considered to be negligible for driver delay as the majority of the B741 is rural in nature with a small number of isolated properties and few local access junctions / side roads. Furthermore, the B741 is not at or close to capacity as demonstrated by Table 11.5. When combined in accordance with Table 11.4, it can be concluded that there will be a negligible driver delay effect at Location 1 which is considered to be **Not Significant** in accordance with the EIA regulations.

Location 2 (Gateside Road)

11.85 Similarly to Location 1, the percentage increase in HGVs appears large (200%) however it only equates to a maximum of 4 HGVs per hour (worst-case) as a proportion of HGVs will route to the site from the north-east (via New Cumnock). The magnitude of change is therefore considered to be slight while the sensitivity is low given that Location 2 is in a generally residential area and the road has a large spare capacity (approximately 37,542 vehicles/24hr residual capacity). A Slight magnitude combined with low sensitivity results in a negligible impact deemed to be **not significant** in accordance with the EIA regulations.

Pedestrian Delay and Amenity

11.86 Traffic volume, composition, speed, pedestrian footways and crossings all contribute to the level of general pleasantness, fear, intimidation and delay experienced by pedestrians and other vulnerable road users.

Location 1(B741)

11.87 There are no footways or settlements along the B741 in the vicinity of the site access and is it not expected that pedestrians will be present in this area. It is therefore considered that the sensitivity of this location to pedestrian delay and amenity impacts as a result of construction traffic is negligible. The magnitude of the increase in HGV levels is slight based on the descriptions in Table 11.3. Combining the magnitude of the effect with the sensitivity of the location, it is considered that increased traffic associated with the Proposed Development will have a negligible effect and can be classed as **Not Significant** in accordance with the EIA regulations.

Location 2 (Gateside Road)

11.88 Gateside Road has footways on at least one side along the length of the road and it is likely that there will be some pedestrian activity, albeit low as it is a residential street with no local amenities. The magnitude of increase in HGVs is considered to be slight as, although the percentage increase is 200%, in reality only equates to approximately 2 more HGVs per hour above the baseline flows. The sensitivity is considered to be low given the residential location, therefore the significance criteria matrix concludes that the effect is negligible and **Not Significant** in accordance with the EIA regulations.

Accidents and Safety

11.89 Whilst it is acknowledged that there are varying road characteristics along the length of the routes within the study area, for the purpose of this calculation it has been assumed that the length of road is approximately 17 km (from where Gateside Road meets the A713 in Dalmellington to where the B741 meets the A76 (T) in New Cumnock) and can be classified as 'rural good single carriageway' in accordance with the criteria set out within DMRB.

11.90 Accident rates from the DMRB for this standard of road are:

- Rural good single carriageway: 0.190 Personal Injury Accidents (PIA) per million veh-km.

11.91 Assuming a two-way trip on the 17 km for each of the 6,079 vehicles, a total distance travelled of 206,686 km is obtained. Based on the rate above this suggests 0.039 PIA during the construction phase.

11.92 It is considered that the magnitude of this effect is negligible but receptor sensitivity to this effect is always considered as high. Then combined, the effect can be classified as minor and **Not Significant** for Locations 1 and 2.

Dust and Dirt

11.93 IEMA Guidelines acknowledge that it is not practical to quantify the level of dust and dirt that can be anticipated from development traffic. Therefore a quantitative description of the effect on dust and dirt from construction traffic is not provided here.

11.94 It is acknowledged that HGVs would have the potential to collect debris on their tyres when accessing the Proposed Development. This could be transferred to the road surface when vehicles travel away from the development and can be deposited on the road in the form of either dust or mud depending on weather conditions. Wheel washing facilities (or similar device) will be provided at the site to minimise dust and dirt deposits on to the external road network.

11.95 For all locations within the study area, the magnitude of the effect is considered to be negligible and the sensitivity low. The overall significance of the environmental effects of dust and dirt at all receptors within the study area is regarded as slight and therefore **Not Significant** in accordance with the EIA regulations.

Mitigation Measures

11.96 The assessment does not predict any significant effects (without mitigation). As a result, no mitigation is required to address predicted environmental effects associated with increased traffic in line with the EIA Regulations.

Additional Good Practice Measures

11.97 While not necessary to address the environmental effects associated with the increase in traffic within the study area (in terms of EIA Regulations), the developer wishes to implement industry standard practices and measures to reduce the traffic and transport effects during construction. These mitigation measures have been successfully implemented at other wind farms across Scotland.

11.98 Mitigation measures proposed include the preparation of a Construction Traffic Management Plan (CTMP). The CTMP will identify measures to reduce the number of construction vehicles as well as considering the mitigation of vehicle impacts through construction programming / routing and identification of an individual with responsibilities for managing traffic and transport impacts and effects. The CTMP will also identify measures to reduce and manage construction staff travel by private car, particularly single occupancy trips. The CTMP should include the following measures as a minimum:

- Immediately upon commencement, all deliveries, operatives and visitors to the site will report to the security gate. This will be communicated to all early works contractors at their pre-start meeting;
- The main contractor should develop a logistics plan highlighting the access point for the project, loading bay, pedestrian / vehicular segregation, welfare, storage, security and material handling that will be enforced following full site establishment;
- As part of the construction period's mitigation measures, it is proposed that construction HGV traffic be restricted between the hours of 08:00 – 09:00 and 17:00 – 18:00 Monday to Friday;
- The construction material 'lay down' areas will allow for a staggered delivery schedule throughout the day, avoiding peak and unsociable hours;
- An integral part of the progress meetings held with all trade contractors is the delivery schedule pro-forma. In line with the recommendations of this study, all contractors should be required to give details of proposed timing of material deliveries to the site. At this stage they will be given a specific area for delivery;
- The CTMP and the control measures therein should be included within all trade contractor tender enquiries to ensure early understanding and acceptance / compliance with the rules that will be enforced on this project;
- Under no circumstances will HGVs be allowed to lay-up in surrounding roads. All personnel in the team will be in contact with each other and site management who in turn will have mobile and telephone contact with the subcontractors; and
- To maintain roads in a clean and safe condition, wheel washing facilities (or similar device) will be provided at the site.

Assessment of Cumulative Effects

11.99 Cumulative effects have been assessed for other developments which may utilise any sections of the road network required for the Proposed Development. A review of available data from the Traffic and Transport chapters within the relevant ESs provided the following information:

Afton Wind Farm (consented)

11.100 E.ON UK Renewables has received planning consent for a 27 turbine wind farm to the south of New Cumnock, adjacent to Afton Reservoir. The construction period for Afton wind farm is expected to last for 12 months. The route to the site for abnormal loads is via the A76 (T) onto the B741 (from the roundabout in New Cumnock) to reach Afton Road which continues southwards to the site access. It is anticipated that general construction traffic will also use this route and it is noted that only a very small section of the B741 is required (less than 100m).

South Kyle Wind Farm (consented)

11.101 In 2013 Vattenfall submitted a planning application for a 50 turbine wind farm approximately 5 km east of Dalmellington (south of the B741 road) which received planning consent in June2017. The assessment of South Kyle wind farm has been based on a 19 month construction period. Whilst there are two site access points proposed (from the B741 and A713) the majority of general construction traffic is anticipated to access the site from the B741.

Enoch Hill Wind Farm (in planning/Appeal)

11.102 E.ON Renewables has submitted an application for a 19 turbine wind farm approximately 5km to the south west of New Cumnock. The Traffic and Transport ES chapter for Enoch Hill (submitted in 2015) states that abnormal loads and general construction HGVs will reach the site from the Port of Ayr via the A77 (T), A76 (T) and the B741 from where the site will be accessed from. It is noted that no traffic associated with Enoch Hill is distributed over the A713 or Gateside Road.

Pencloe Wind Farm (in planning/Appeal)

11.103 Pencloe Wind Energy Limited has submitted a planning application for a 19 turbine wind farm on land to the south of New Cumnock, adjacent to the Afton Wind Farm site. Construction is anticipated to take 18 months whereby the route for abnormal loads and the main route for general construction HGVs is via the A76 (T) through New Cumnock, onto the B741 to reach Afton Road and the site access. The ES for Pencloe advises that a proportion of construction traffic may utilise the A713 and B471 through Dalmellington.

Other Land Uses

11.104 East Ayrshire Council have produced a map demonstrating the cumulative land uses in the local authority area for wind farms, opencast operations, quarries and landfill sites[4] (accurate as of January 2017). The map indicates that all quarry and landfill sites within the vicinity of the Proposed Development are either operational or unrestored, i.e. there are no sites in proximity to the Proposed Development which are consented but not operational or current application sites. Consequently, vehicle movements associated with the operational sites are covered in the baseline traffic flows and do not require a cumulative assessment.

Summary of Cumulative Effects

11.105 In assessing the proposed routes of abnormal load vehicles and general construction traffic for each development, the following wind farms require use of the A76 (T) and could potentially have a degree of overlap in timescales with the Proposed Development:

- Afton Wind Farm ;
- Enoch Hill; and
- Pencloe.

11.106 It is noted that there is a lot of uncertainty around the start dates for committed developments and the detail of the construction programmes. This makes any form of quantitative assessment difficult and potentially highly inaccurate.

11.107 The A76 strategic trunk road network has a large carrying capacity which is capable of accommodating temporary spikes in total traffic and HGV levels. As indicated by Table 11.5, the A76 (T) has an approximate carrying capacity of 57,600 vehicles/24hr which, including the Proposed Development's peak month construction traffic, is only 12% fulfilled (as a worst-case scenario). Taking this into account, it is considered that cumulative effects along the A76 (T) will effectively be absorbed and will not give rise to any adverse effects. Furthermore, implementation of a CTMP will ensure that the peak traffic generating month of the Proposed Development will not overlap with any other development's peak month to keep traffic impacts to a minimum.

11.108 Whilst the A76 (T) is a popular route for the transportation of abnormal loads, there is no scope for overlapping abnormal load movements as they are closely regulated and would not be permitted to occur simultaneously.

11.109 Utilisation of the A713 for general construction traffic is proposed by the following developments:

- South Kyle; and
- Pencloe.

11.110 With regard to Pencloe wind farm, it is anticipated that use of the A713 would not be the primary route. Notwithstanding this, implementation of a CTMP will ensure that the peak

[4] https://www.east-ayrshire.gov.uk/Resources/PDF/E/EACumulativeLandUseMap.pdf (accessed March 2017)

traffic months and the greater traffic generating activities (i.e. stone / concrete importation) for each development would not coincide to keep the impact to a minimum. Similarly to the A76 (T), the A713 is a good standard single carriageway road with a large capacity of which only approximately 7% is utilised (at Location 3 with the worst-case development traffic included). As a result, it is considered that the cumulative traffic impact along the A713 will be diluted across the network and not give rise to any significant environmental effects.

11.111 Utilisation of the B741 is proposed by the following developments:

- Afton;
- South Kyle;
- Enoch Hill; and
- Pencloe

11.112 It is noted that there is no significant overlap in the route associated with the Afton windfarm. It is unclear as to when the construction periods of each wind farm development will commence, however, the likelihood of the peak construction month coinciding is very low. Given that this assessment demonstrates that the peak construction month for the Proposed Development will not give rise to any significant effects, during the other months which are lighter in terms of traffic movements there is significant capacity within the network to accommodate movements by other wind farm developments.

11.113 A CTMP would ensure that there is communication between other construction sites to minimise impacts and would, in turn, ensure that larger traffic generating activities (such as stone importation or concrete pours) are staggered.

Residual Effects

11.114 Subject to the successful implementation and monitoring of a CTMP, it is considered that any residual effects associated with the construction phase will be of a temporary nature and the magnitude will be negligible or none given that prior to mitigation, all effects are considered as not significant. As a result, the residual effects after implementation of a CTMP would be classed as **Not Significant**.

Summary

11.115 The conclusion of this FEI Traffic and Transport Chapter for the Proposed Development remains consistent with the findings of the original ES Chapter. The changes to the baseline conditions of the study area and the number of loads associated with the construction stage of the Proposed Development since the original chapter was prepared are minimal and this chapter demonstrates that there will not be a significant impact.

11.116 In summary, the construction programme associated with the Proposed Development is anticipated to cover a 13 month period. During this time, 6,079 HGVs (117 of which are abnormal loads) would access the site in total. The busiest construction month in terms of traffic generation are Months 1, 2 and 3 with 1,486 two-way HGV trips equating to approximately 68 daily two-way HGV trips.

11.117 The vehicle movements of abnormal loads is not anticipated to exceed 20 two-way trips per week over the course of 3 months with no overlap during the peak traffic month. It should be noted that abnormal loads retract to the size of an HGV on their return journey, therefore, effectively there will only be 10 one-way abnormal load trips per week over the 3 months.

11.118 A robust assessment was undertaken using the worst-case scenario of two-way construction traffic movements, assuming that 45% of stone requirements are imported to the site. There is possibility that a large proportion of stone can be won on-site which would significantly reduce the number of HGV movements for these activities.

11.119 The worst-case impact of construction traffic is anticipated to increase total traffic flows in the study area by the following amounts:

- 13% on the B741 at the site access;
- 6% on Gateside Road within Dalmellington;
- 1% on the A713 near Patna;
- 3% on the A713 to the south-east of Dalmellington;
- 1% on the A76 (T) north-west of New Cumnock; and
- 2% on the A76 (T) east of New Cumnock.

11.120 The percentage increase in total traffic at each location is considered to have a negligible impact. The percentage increase in HGVs associated with the worst-case month of the construction programme for the Proposed Development is anticipated to increase HGV levels by the following amounts:

- 400% on the B741 at the site access;
- 200% on Gateside Road in Dalmellington;
- 22% on the A713 near Patna;
- 29% on the A713 to the south-east of Dalmellington;
- 5% on the A76 (T) north-west of New Cumnock; and
- 2% on the A76 (T) east of New Cumnock.

11.121 A full environmental impact assessment was undertaken for the B741 and Gateside Road (Locations 1 and 2 respectively) as per IEMA guidelines. The significance of the predicted effects of the Proposed Development on the traffic and transport resource during the construction phase has been discussed in this chapter and are summarised in Table 11.11.

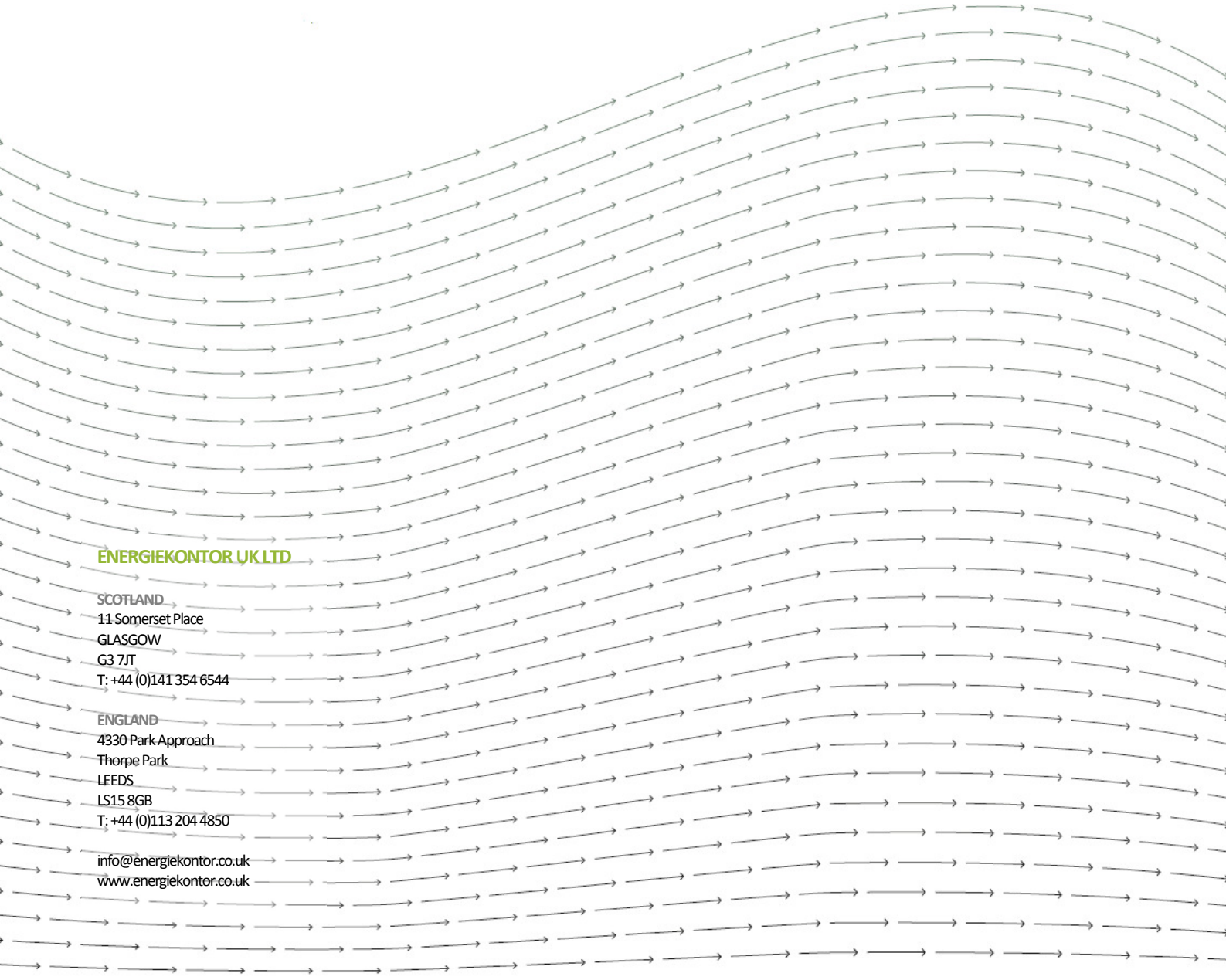
Table 11.11: Summary of Construction Effects and Significance

Likely Significant Effect	Mitigation	Means of Implementation	Outcome / Residual Effect
Severance	None required	N/A	Not significant
Driver Delay	None required	N/A	Not significant
Pedestrian Delay and Amenity	None required	N/A	Not Significant
Accidents and Safety	None required	N/A	Not Significant
Dust and Dirt	None required	N/A	Not Significant

11.122 Although mitigation is not required in accordance with EIA regulations, it is proposed that a Construction Traffic Management Plan is implemented which would ensure that impact of traffic associated with the Proposed Development is as minimal as possible. Furthermore, a CTMP would ensure that no significant effects occur as a result of cumulative impacts with other wind farm developments in the area by staggering the peak traffic months and movement of abnormal loads.

Glossary and Abbreviations

Abbreviation	Expanded Term
A76(T)	A76 Trunk Road
AADF	Average Annual Daily Flows
ATC	Automatic Traffic Count
CTMP	Construction Traffic Management Plan
EAC	East Ayrshire Council
DMRB	Design Manual for Roads and Bridges
DfT	Department for Transport
EIA	Environmental Impact Assessment
ES	Environmental Statement
HGVs	Heavy Goods Vehicles
IEMA Guidelines	Institute of Environmental Management and Assessment Guidelines
IHT	Institute of Highways and Transportation
LGVs	Light Goods Vehicles
SPA	Swept Path Analysis
PIA	Personal Injury Accidents



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